THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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THE OCTOBER MEETING OF THE INSTITUTE.

THE meeting of the American Institute of Mining Engineers, held week before last in Philadelphia, was one of the quietest, yet one of the most important, in the history of that body. In accordance with the previous announcement of the Council, no attempt was made to intersperse the sessions with general excursions or social entertainments. Every one felt that this had been done for the great Centennial meeting in June, on a scale amply sufficient for both occasions. Moreover, the desire of members in attendance to use all available time in completing their acquaintance with the Exhibition in Fairmount Park, could be gratified only by leaving entirely free such days or parts of days as were not occupied with reading or discussing professional papers, and the transaction of necessary business.

The proceedings of the four sessions were not deficient in interest. Several papers were highly important—none more so than the report of the distinguished International Committee on the Nomenclature of Iron and Steel, presented by Mr. HOLLEY, the chairman. A paper of startling novelty and interest, also presented by Mr. HOLLEY, was that of Mr. RIDER, of the Otis Iron and Steel Works, on the Determination of Carbon by Magnetic Tests. Mr. WETHERILL'S paper on Anthracite Coal Mining was very clear and thorough, at the risk of being somewhat elementary in parts. We think this a good feature, when not—and by Mr. WETHERILL it was not—carried to excess. Even in a meeting of mining engineers, particularly if they came from various quarters and are busy in different branches, it is well to state plainly the simplest facts of practice in any special line. Mr. WETHERILL'S summary was so well put that it would serve, almost without changes, as a text-book for a student.

Mr. HOWE'S thoughtful and mathematical paper on the Increase of Height in Blast Furnaces brought out a very interesting talk (partly aside from the main question, but welcome nevertheless) from Mr. THOMAS WHITWELL, whose hot-blast ovens are the subject of so much discussion now-a-days among iron-masters.

Prof. MUNROE'S sketch of the proposed mining school in Japan developed some highly suggestive ideas, which, to the universal regret of the members, there was no time to discuss fully. We were particularly sorry to learn subsequently that Prof. MURRAY, of the Japanese Department of Education, was present, and was prevented by the lack of opportunity from adding something from his thorough knowledge concerning the great educational movement of the Japanese Empire.

Mr. SADLER'S paper "On the Volumetric Determination of Sulphur and Ammonia in Illuminating Gas," was exceedingly thorough, and no doubt proved interesting to the gas-chemists, of whom the Institute reckons a considerable number in its membership. It must be confessed that the manufacture (and, consequently, the analysis) of illuminating gas is a matter not usually classed as metallurgical; but the Institute could well afford to be liberal on such a point, and welcome to an audience able to comprehend and appreciate chemical work, a paper which, if it had been presented to the official body of the gas engineers, would perhaps have been "squelched," and certainly would not have been understood.

But the most important event of the meeting was probably the report of the Centennial Committee, which we published with the other proceedings last week. Doubtless the main features of that statement conveyed nothing new to the members. The general fact that the plans of the Committee had been crowned with success; that the Centennial Headquarters had been thronged with members and guests; that the weekly gatherings had been full of interest and profit; that numerous foreign engineers had been effectively assisted in their examinations of the Exhibition and of the country; these were notorious. It was probably known also to all (having been published in the ENGINEERING AND MINING JOURNAL) that the Imperial German Government, and some other exhibitors, public and private, had made valuable donations to the Institute in acknowledgment of its services and professional standing. But we fancy that few were prepared to hear how extensive had been the activity, and how great the success, of the Centennial Committee. And still greater surprise must have attended the hearing of the munificent and numerous donations offered to the Institute.

The generous offer of the Trustees of the Pennsylvania Museum and School of Industrial Art, relieves the Institute from present embarrassment in receiving these gifts. As our report of proceedings showed last week, the Institute accepts the provisional arrangement proposed, and the Council is authorized to take further measures, while it is restricted from applying to the purpose of moving or housing the collections any of the ordinary funds of the Institute.

The Council has since appointed a special Committee to take charge of this subject. The following gentlemen (all of whom have accepted their appointment) constitute the Committee: Mr. J. S. ALEXANDER, Philadelphia, Chairman, Prof. J. P. LESLEY, Philadelphia, Mr. WILLIAM SELLERS, Philadelphia, Prof. THOS. EGLESTON, New York, Mr. WILLIAM METCALF, Pittsburg, Mr. A. L. HOLLEY, Brooklyn, and Mr. WILLIAM G. NEILSON, Philadelphia, Secretary. This Committee will doubtless require a fund to pay for moving the collections to Memorial Hall, and installing them there in cases adequate to their proper preservation. This fund will be raised by direct appeal to the members, as was the fund of the Centennial Committee; and we are sure it will be administered, as was that, with fidelity and economy. Mr. ALEXANDER, the Chairman of the new Committee, has been an active member of the Centennial Committee, and has given already to this fresh responsibility a vast amount of enthusiastic voluntary service, directed by exceptional executive ability. Meanwhile, "it never rains but it pours." The knowledge that the Institute will receive and keep for exhibition valuable collections of minerals, drawings, models, etc., has apparently fired the hearts of exhibitors at Philadelphia with a genuine enthusiasm of giving; and donations are offered on every side. We will give hereafter a full list of those received.

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MEXICAN TARIFF LEGISLATION.

MEXICO is admitted by all who have had opportunity for examining its mineral wealth to be one of the richest countries in the world in the precious metals. This fact being then universally admitted, why has there been such an indisposition on the part of capitalists to make investments there. The cause is easy to be found in the state of chronic revolution and periodical "forced contributions" that have afflicted that unfortunate country. The object of the successive governments that have held power seems to have been anything but the fostering of industry or the development of the great natural resources of the country. We are pleased to note that one step at least, and that an important one, has been taken on the road of progress. In the past the Mexican Government, not satisfied with the various contributions made on the mining companies, has collected an export tariff of 14 per cent on all silver leaving the country. This tax, amounting in itself to a fair profit for a mining company, and generally quite sufficient to absorb the entire profits of the concern. According to the following law, which has just received the signature of the President, the export duty on nearly every product of Mexico is abolished, and on silver and gold the duty is reduced to a little over four per cent. instead of fourteen. The interest of Mexico will be found in abolishing these export duties altogether and in adopting such a policy as will attract capital to its magnificent mines, and we welcome this step as one in the right direction. If now the Government would, or could, but secure peace to that distracted country, it would wonderfully increase the commercial intercourse between the two republics; as it is, Mexico is now an inviting field for our manufacturers of mining machinery and supplies of various kinds, and we understand that quite important orders have recently been received from there for articles coming under these classes.

NEW LAW REGULATING EXPORT DUTIES.

Article 1.—From the 1st of February, 1877, shall be free from all duty, in the United States of Mexico, the exportation of all the national fruits, products, articles, fabrics and manufactures.

Article 2.—From the same date shall cease, consequently, the export duties that the Federal Treasury now imposes on various national articles, and all those which the States imposes on national commodities intended for exportation, no matter what may be the name by which they may be designated.

Article 3.—In conformity with the provision of Section I. of Art. 112 of the Federal Constitution, the States shall not, without the consent of the Congress of the Union, either re-establish duties that remain suppressed by the preceding article, or impose other new ones upon national commodities intended for export.

Article 4.—Consequently, all duties which some States have at present established on the circulation of bullion, shall be abolished.

Article 5.—No state can impose duties on the mere transit of merchandise through its Territory, whether it be destined for exportation or consumption in another State, nor impose, under whatsoever denominations on the products of other States, greater duties than it imposes on its own products.

Article 6.—There are excepted from the provision of Article 1 of this law the metals of gold and silver, coined or uncoined, which shall pay a coinage duty of four dollars and forty-one cents per hundred on silver, and four dollars and sixty-two cents per hundred on gold. Ores, concentrated or not concentrated, shall continue free from all duty conformably to the law of the 7th of January, 1869.

Article 7.—From the first day of December of the present year there shall be imposed, in the maritime and frontier custom houses of Mexico, a duty of ten per cent. on the quotations of the import Tariff of Imposts of the 1st of January

1872, with the after modifications as to foreign merchandise which is imported into the Republic, in place of the import duty on gold and silver, which remains suppressed by Article 2 of this law.

Article 8.—From the 1st of February, 1877, every cutter of timber, for building or cabinet-work, cut in the national forests, shall pay to the Federal Treasury, as his only duty, two dollars for each tree. For the payment of this duty each tree shall be considered as a ton-and-a-half of measured timber.

Article 9.—Foreign timber exported from the national territory shall pay, as the only duty of transit, two dollars per measured ton.

Article 10.—The Executive shall regulate, within three months, the exportation of national fruits, simplifying the proceedings and formalities which now exist, and will modify the regulation of April 18, 1861, relating to the cutting of timber, in conformity with the terms of this law.

THE NOMENCLATURE OF IRON.*

By Dr. Wedding of Berlin, Prussia.

I ASK your permission to speak about a matter, which is not of a specific scientific nature, but more of a general—I might even say of an international nature—I hope I shall be excused in that, but your city is, at the present time, indeed international. The Germans, very often, are thought to be an exceedingly warlike people, but I come to-day in the capacity of a peacemaker. Our German language is an original language; it is, therefore, a language in which it is impossible to change the meaning of a word at will. It may be, perhaps, easier in a combined language, as the English, to associate and to exchange meanings. Now, a word of which much is spoken at the present day, is "*Stahl*," in English, "Steel." This word means, in the German language, a substance which *can* be hardened. As the German literature, in relation to metallurgy is the oldest of the modern world, this circumstance may give the German a right to ask for consideration. But I think, now, when the four languages of German, Swedish, French, and English, compete in rich metallurgical literature, it is very necessary to have uniformity in the nomenclature of iron, which would prove not only useful for science, but equally so for trade. For that purpose I propose to make the divisions of iron so that the word steel shall comprise a subdivision and not a primary division as formerly.

Nature furnishes us iron mostly in the state of oxides, and if in any other condition, we must convert the ore into oxide before we can make iron. The oxides are always mixed with certain earthy substances called rock or gangue. The extraction of iron involves, therefore, the twofold process of the reduction of the iron, and imparting to it the right amount of carbon necessary for technical purposes, and the separation of the reduced and carbonized iron from the gangue. The reduction is always effected by carbon or carboniferous substances (coke, anthracite, carbonic oxide, etc.,), and the result is, according to the degree of heat employed, either *malleable* iron or a *non-malleable* iron. The process of making malleable iron in this way is called, generally, the direct process, in German, *Rennarbeit*. It produces the iron in a solid state and a fluid cinder. By this process our ancestors made all their iron, and it has been revived in various ways in modern times up to Mr. BLAIR, so far as I know, always without commercial success. The product of this process we call *Renneisen* (with the subdivisions Renneisen and Rennstahl), for which I propose in English the name of *run iron* (French, *fer de loup*). As the heat increases you get an iron which is too rich in carbon to be malleable; this is called generally *pig or cast-iron (Roh, or Gusseisen)*, (French, *fonte, or fer fondu*. It is made in the blast-furnace, both gangue and iron being separated in a fluid state. There could be a third process, namely, to leave the rock in the solid state and melt the iron; but this is not yet practiced. The largest amount of iron is used in the malleable state, and, therefore, most of the pig iron must be converted again in that state. This is done by processes which take out a certain amount of carbon, and, besides, some other matters, principally silicon. These processes, of which the three most used in practice are the charcoal-finery, the puddling and the Bessemer process, are called in German *Frischprocesse*, English, *fining*, and for the product I propose, *Frischeisen*, English, *Fined iron* (subdivisions may be: Charcoal-hearth iron and steel, puddled iron and steel, Bessemer iron and steel), French, *fer affiné*.

It often occurs in these processes, that by design or by accident the carbon is entirely taken out, and even the iron may become partially oxidized. In these cases it is necessary to add to the iron substances, which take out the oxygen, and also, in most cases, add carbon. We have different processes, as, for instance, the converting process, which puts carbon into iron when only heated, not smelted. But the way most used at present is to add pig iron (often Spiegeleisen), or a substance of allied composition containing manganese or silicon, with the fixed iron, to get rid of the superfluous oxygen and to heighten the amount of carbon. In these cases we obtain a molten product. Therefore we call it in German, *Flusseisen*, (with the subdivisions of *Flusseisen* and *Fluss-stahl*), and I propose in English the name of *flow-iron* or *ingot-iron* (French, perhaps: *Fer coulé* or *fer de l'ingot*). You can make by one of these processes at will, an iron of any degree of carbon. So for instance, PARRY made cast iron again, and fined it by the Bessemer process; or you can take run-iron and smelt it with pig-iron. That makes no difference in the nomenclature. I should be glad, if this occasion should lead to a definite international nomenclature, which, in my opinion, is so very necessary.

DISCUSSION.

E. B. COXE. Are not the fires used in making iron direct from the ore called *run-out* fires, and should not the iron therefore be called "run-out iron?"

N. G. NEILSON. "Run-out iron" is not made by the direct process. The technical terms, run-out fire and run-out iron, refer to the treatment of pig iron for use in the charcoal forge; it is finery iron.

F. FIRMSTONE. I agree decidedly with Doctor WEDDING that hardening is the essential property of steel, no matter how made. I think that the terms proposed for the different processes by which it is possible to make iron are good, and may finally come into English technical literature, but the past has left us one or two unfortunate words which closely resemble some of those proposed for the new nomenclature.

If my memory serves me, PERCY laments his inability to use the words "fining" and "finery processes," for those methods which produce what Dr. WEDDING proposes to call "fine-iron" or "fine-steel," because in England they call *re*-fining the process, preliminary to the conversion of cast iron into malleable, which consists in blowing on melted gray iron to change it into white before its use in the charcoal forge or puddling furnace.

His objection was to the use of the term *refining* for the preliminary process, and of *fining* for the finishing process, and perhaps is hypercritical, but as far as it goes it is an objection to Dr. WEDDING's proposed word. In common conversation, too, and perhaps also in books (but I am not so sure of that), the product of the refinery is called "fine metal."

Again, the term "run-iron," in England, would cause no confusion, but in America we very frequently, and perhaps generally, at least in central Pennsylvania, call the refinery (the fire in which gray pig iron is changed into white) the "run-out" fire, but neither this, nor the objection above, to the term "fine iron" is of much moment in itself, and is of very little moment in the future, because the refining process has now almost entirely gone out of use.

I think Dr. WEDDING's paper is a step in the right direction. When we come to discuss processes, and the products of these processes, it is necessary that we should use terms which will be understood, not only in our own, but in all other languages. To use words which are not understood, and which are difficult of translation is an impediment to progress. Dr. WEDDING's suggestion of an international committee to settle what terms are to be used, it strikes me, hits the key-note of the solution of the whole subject. Nearly all the great iron producing nations are represented here, and since it seems very desirable that we should use either a common language or words susceptible of being translated, when we speak of processes and products, I think it would be possible to have a committee appointed by the Institute for the purpose of discussing this question in detail, in the hope of setting at rest the confusion which has arisen from the use of words which convey a definite meaning to one author, or, perhaps to one country, but not to others. We used to know what the words steel and iron meant. The ideas which they conveyed were for a very long time fixed. The progress of iron and steel industry has within a few years made the words almost unintelligible. I see no reason at all why we should not use other words, and if an international committee could agree as to what these words should be, we should not only be able to get at what would express one meaning but possibly a simpler scientific classification of our iron and steel processes. Dr. WEDDING's classification with its accompanying diagram, seems to me to be the most philosophical which has yet been presented, and, therefore, a very good basis for the attempt to solve the question.

No one knows better than myself the difficulty of getting correct words to express the ideas of phases of processes. I think there is some objection to some of the terms which have been proposed. From the run-out fire we have been in the habit of calling the product, not fine, but *fined* metal, because the process is a process of fining. The metal which comes out is not fine, or pure metal, fit for commercial purposes, but it is fined metal; that is, metal which has undergone a process of oxidation, which has been stopped at a certain point. Refined iron is altogether another thing. It is an iron which has gone through the process of refining, and is a merchantable product, as is also fine iron. We, therefore, have the words fine, fined, and refined, all of them expressing different ideas, and yet so nearly alike, that it requires a considerable effort of the voice to make the terms distinctly understood. If these words were written, there would be no difficulty whatever, but it seems possible to substitute others which would be just as precise, and not so difficult to pronounce. There are many other terms that are even more objectionable. It is, however, impossible to go into this matter in detail here. It seems to me that the only solution is that of an international committee to discuss and agree upon the words. We have taken fifteen years to get into this disagreeable confusion, and it will take some time to get out. If the committee was appointed now, and the representative of each nation should use the proper means to bring the subject before his own countrymen, we might, in two or three years, arrive at a solution, for it would take that time at least, since after the matter had been agreed upon in committee, it would have to be accepted by the different nations interested, and the world at large. It seems to me perfectly feasible to fix upon either words which can be translated from one language into another; or, perhaps, the same, or some of the same words, might be admitted in all languages without translation. When we have accomplished this, I think we shall have solved a very important question, and that we shall also ascertain that our present difficulties, which are those of words, are more apparent than real.

Mr. HOLLEY.—I quite agree with Dr. EGLESTON; it seems to me that this discussion in which some of us have taken part, about "what is steel," and "what steel is," and what steel is not, has been more amusing than profitable, except that it has been profitable in this respect—it has shown us how incomplete the present nomenclature is. It seems to me that for the very first time in this Institute, and the first time anywhere, so far as I am aware, Dr. WEDDING has proposed a nomenclature which will approximately suit the conditions of the case. I do not quite agree with him in regard to the particular terms, but as to the theory, perfectly. The other day I had the pleasure of quite a long discussion on this subject with Professor AKERMAN, Professor PRIME, and Mr. FRITZ. We concluded to agitate the question of proposing a nomenclature something like that suggested by Dr. WEDDING.

The idea was to call all malleable compounds of iron cast from a fluid state, whatever their amounts of carbon, and whatever their properties of taking temper might be, "ingot metal." All forms of wrought iron were to be called "pile metal," and catalan products and the like were to be called "bloom metal." I think we might, without waiting two or three years for Professor EGLESTON's committee, settle the nomenclature now.

Professor EGLESTON.—It might be settled sufficiently now, but it would take two or three years to have it introduced.

Mr. HOLLEY.—It seems to me so sensible, that the public would accept it at once. What does Dr. WEDDING think of this nomenclature—"bloom metal," "pile metal," and "ingot metal?"

Dr. WEDDING.—About bloom metal I quite agree, because there is no reason why that name should not be used, instead of run metal, as I proposed. About the name *ingot metal* we agree quite. But I think the name *pile metal* should not be used, because the puddled ball is not a piled metal, and still belongs to the same kind of iron, or is a product of one of a series of processes, which belong to the same group of metallurgical operations, as charcoal-hearth firing. It is true, that most of the bars, coming forth from the puddling process will be piled, but the process of piling has nothing to do with the nature of this iron. Indeed, Mr. BORSIG at Berlin, makes plates of large puddled-balls, which are not piled at all, but worked as a whole. Out of the charcoal fine fire, again we get a ball of iron, which though generally not piled, is sometimes piled, for instance for heads of rails.

Again, Bessemer iron is very seldom piled; but, if it is, it keeps the same nature, and you can hardly call it pile iron in the sense proposed by Mr. HOLLEY. Therefore I wished to have another expression, giving the nature of the iron, which would be correct for puddled iron and steel, fined iron and steel,

* A communication to the American Institute of Mining Engineers, at the Philadelphia Meeting, June, 1876.

This paper, the publication of which has been unavoidably delayed, led to the appointing, by the American Institute of Mining Engineers, of an International Committee on the Nomenclature of Iron and Steel, the report of which was published in the Journal of Oct. 28.

etc.; and perhaps you will find, better than I, one in the English language—perhaps pile iron, which means not that the iron *is* already piled, but that it *can* be piled and welded.

Mr. HOLLEY.—The term "pile" was intended to be opposed to the term "cast." We have got to have some term which expresses a heterogeneous, as distinguished from a homogeneous metal. The term pile is not exactly right, although when a portion of the puddled ball has been folded on another portion, it is piled to a certain extent, just as puddled balls are piled upon one another.

A MEMBER.—Would it not be as well to use the term welded iron instead of piled?

Prof. FRAZIER.—Why not use homogeneous and heterogeneous instead of "piled" or "ingot;" in other words, I object to any method of classification based on the process of manufacture, because such a classification must be temporary and change as processes are varied. Any method of classification to be permanent must, I think, be based upon the characteristics of the metal, or on its average characteristics.

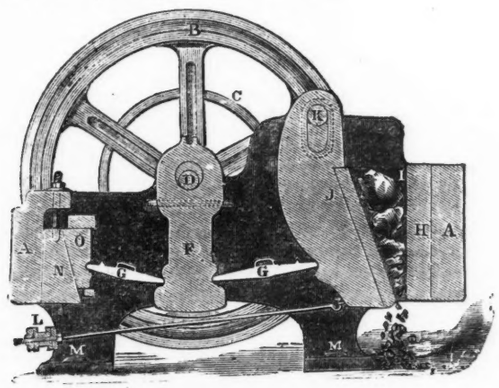
Dr. WEDDING.—Allow me to say now, after this discussion, that I should like the term welded iron better than piled iron. I should ask if it is not possible in the English language to say "weld iron;" I mean, iron which *can* be, or *should* be heated and welded.

Mr. COXE.—Would not welding iron be better?

ORE CRUSHING MACHINERY AT THE PHILADELPHIA EXHIBITION.

Special Report of the Engineering and Mining Journal.

THE enormous quantity of stone and various ores which are annually crushed in this and other countries, has stimulated the invention of a great variety of machines for doing this class of work. In this country, more perhaps than in any other, have these attempts been made, and the result is to be seen in the considerable number of machines which are to be classed as successful ones. For simply crushing, or for fine crushing, with partial pulverization, the well-known Cornish Rolls have long been successfully used in many reduction works in Europe, and in a few in this country. The nature of the machinery is such, however, as to practically preclude its use in rock-breaking operations for road construction, as well as the preliminary treatment of ores in many of our Western reduction works, where the temporary or precarious production of ore from the mines makes it almost necessary to have the whole establishment mounted on wheels and ready, at short notice, to move to some more promising locality. The slow motion of the rolls, the backward slip of the rock or ore being crushed by them, caused the loss of considerable power in working, and limited seriously the capacity of the mills. As it is necessary that these rolls should not be rigidly fixed in position, but held in place by weights, or strong springs, it often happens that in the crushing of hard ores pieces frequently pass through so large as to need re-crushing to reduce them to the maximum size determined upon. The unequal wearing of the rolls, or of their outside casings or shells, makes the expense of replacement considerable, when operating on hard rock or ores.



THE BLAKE CRUSHER.

This machine was invented by ELI W. BLAKE, of New Haven, in 1858. The principle upon which it works is essentially different from that of the Cornish Rolls, the crushing being effected by means of two adjacents, and slightly converging surfaces, placed in a number of vertical directions, and which are made to alternately approach and recede from each other, through the agency of a toggle-joint motion. The nearly parallel position of the two crushing surfaces prevents, almost entirely, the back-slipping of the material being operated on. The considerable speed at which this machine can be run, makes its capacity high, when it is compared with the Cornish rolls.

The maximum number of revolutions which Cornish rolls are run at, seldom exceeds fifteen per minute, while a Blake's Crusher is frequently run at two hundred and fifty vibrations per minute.

The Blake Crusher Company exhibit one of their No. 5 machines in Machinery Hall, which is kept constantly in operation. It differs from those made at first, by not having a long lever to work the toggle joint. In place of the lever, the fly-wheel shaft (see fig.) is placed on the frame of the crusher, directly above the center of the toggle-joint. An eccentric, placed on this shaft, works the pitman F, against which the two toggle plates, G G, are hinged. The other ends of these toggle plates bear against the movable jaw J, and the toggle block O. It will readily be seen that the vertical motion of the pitman F, will cause the jaw J to work about its center K, through a short arc. The approach of the two jaws to each other can be regulated by raising or lowering the wedge N by means of the screw W. The backward motion of the movable jaw J is insured by means of the rod M, and rubber-spring L. The jaws are lined with corrugated face-plates of chilled iron, which are reversible, so that when their lower portions become worn, they can be inverted.

The smaller, or A machine, made by the Blake Company, has a receiving capacity, *i.e.*, dimensions at top of jaws of 10 by 4 inches. When running at 250 revolutions per minute, it will crush three tons of rocks, so as to pass through a No. 4 sieve, per hour. This duty requires a four horse-power engine.

The No. 5 machine, which is exhibited in Machinery Hall, is the size most commonly used for crushing ore for stamps, and preparing iron ore for furnaces. Its receiving capacity is 15 by 9 inches, and when run at 250 revolutions per minute, it will crush about nine tons per hour. This machine requires a nine horse-power engine to run it.

THE STETEFELDT FURNACE—EXPERIENCE AT THE AUBURN MILL, RENO, NEV.

By A. D. Hodges, Jr.

THESE notes refer to the years 1871 and 1872. During that time the mill treated ores of the most varied nature and from very different localities. If an ore was considered very "rebellious," it was sent to the Auburn Mill for treatment, while more easily-worked material was kept at home. Large supplies were drawn from Utah, but the rise in the railroad freight tariff in the Winter of 1871-72 interfered materially with the shipments of the lower grades of ores, the increase in the freight charge being sufficient to counterbalance the small profit previously derived from such ores. From Humboldt County, Nevada, and from various places along the line of the Central Pacific Railroad, considerable amounts were derived. Very rich ore, running from $400 to $900 per ton, was received from Mono County, Cal. This was the partzite or stetefeldtite ore, of which so much has been said. The most distant locality from which shipments were made was British Columbia, whence one lot of 20 tons was received.

The Utah ore held often considerable chloride of silver with oxidized silver, lead, minerals, and generally lime. This class of ore was the most difficult to treat. Ores (as much from Humboldt County) with quartz gangue and considerable sulphurets (of lead and zinc) worked well. The Stetefeldtite ore, although causing some trouble with the men on account of the dust, which was claimed to be worse than from the usual run of rock, always roasted very well.

The general plan of working was this:—The ore was broken in a Blake crusher, and carefully sampled for assay. It was then dried on the dry kiln, on which was spread first the required amount of salt—from 6 to 10 per cent.; crushed under the stamps; carried in mechanical conveyers to the furnace and roasted; and, finally, amalgamated in Wheeler pans.

The plant of the mill was as follows:—1 Blake crusher; 20 stams of 750 lb. each; 1 Stetefeldt furnace, with dry kiln, etc.; 12 small Wheeler pans; 6 settlers; 2 agitators; boiler; retort; overshot water-wheel of 28 feet diameter and 16 feet face, calculated to furnish 108 horse-power.

The ditch from the Truckee River is some two miles long, built to be 4 feet deep, 8 feet wide at the top and 6 feet wide at the bottom, with a fall of 3-16 inch to the rod, and calculated to carry 4,000 inches of water per minute.

Sampling.—For sampling, the ore was crushed to a uniform size in the Blake crusher, and spread out evenly on the floor to a depth of 8 to 10 inches. Cuts of the width of a shovel were run through the pile in two directions and about 4 feet apart, from the ore obtained from these cuts another similar pile being made, and this being continued until a pile of about 100 lb. is obtained. The ore is now again crushed, spread out and reduced as before, until the amount is brought down to 20 or 30 lb. This is then taken to the assay office, crushed fine, and re-sampled down to about one pound. Some of the customers preferred sampling from the battery, which was done when requested. But a battery sample never gave higher results than the other, and often somewhat lower ones. In case there are malleable minerals of the precious metals present, it is easy to see why the battery sample should be the poorer.

Crushing.—The battery stamps weighed 750 lb. when new, had a fall of 8 inches, and dropped about 80 times per minute. The screens were No. 55 wire. The batteries were single discharge.

General experience teaches, I take it, that the most rapid crushing by stamps is effected when only sufficient ore is kept in the mortar to prevent the shoe and die from coming in contact. But one battery feeder at this mill persisted in keeping the mortars so full that the foreman was in constant expectation of the choking of the batteries. Yet from this cause the stamps were hung up only once, and this feeder crushed 1½ tons to the stamp where no other feeder had been able to put through more than a ton.

The Furnace.—The Stetefeldt furnace is 28 feet high and 4½ feet square at the base. It is of the old pattern, with two fire-places for wood at the base and one at the flue, using the old form of feeder—two simple wire screens. It was built in 1869, and although cracked a little by earthquake action, has stood the wear and tear extremely well, having needed no repairs of any consequence.

The amount of ore roasted daily was in practice 16 tons. Unquestionably the furnace will treat more, but during the time alluded to this was all which the batteries would crush, one battery of four stamps being hung up for repairs nearly all the time.

On each shift of 12 hours three workmen were employed, one tending the feeding apparatus, one firing, and one drawing out the roasted pulp, and wheeling it to the pans. Whites were employed for a long time, at $3 per day, but afterward Chinamen.

The amount of salt used averaged in practice 8 per cent., but this was undoubtedly in excess of what was needed in many cases, and may possibly have been injurious in the subsequent amalgamation. When the furnace was kept running night and day an average of 1¼ cords per 24 hours was consumed, slab wood answering all purposes. A charge was drawn every hour. The roasting expenses, when running on full time, may be given as follows, taking as data the actual work done at the Auburn mill. Chinese labor is referred to:

2 Firemen at $2	$4 00
4 Feeders and dischargers at $1.75	7 00
8 per cent. salt = 2,560 lb. at 1¼ cents	38 40
1¼ cords of wood at $5	7 50
Total expenses for 24 hours	$56 50

or $3.56 per ton.

Roasting Results.—With careful management this furnace gave excellent results. The chief requisites were: Regular firing, sufficient heat, and controlling assays. In practice it was found that the Chinese firemen maintained a more regular temperature than did the whites. So far as my experience went, the best results were obtained when the heat was as great as possible without causing the ore to cake. But the temperature must remain constant. Under these conditions the largest proportions of the base metals are volatilized. Any intelligent foreman who is willing to be guided by assays and not from immature guesses, can easily learn to manage the furnace.

With our workmen it is not possible to employ as high a heat in reverberatory furnaces—principally on account of the caking of the ore—as can be safely used in the Stetefeldt furnace. The advantages of high heat are that the base metals are more speedily and completely volatilized and oxidized,

thus securing a finer bullion, the silver is more fully chloridized, and I have reason to believe an economy in salt can be secured. From the working at the Auburn Mill I was convinced that an unnecessary amount of this material was used. In reverberatories, for mechanical reasons, an excess of salt is requisite. But in the Stetefeldt furnace, not only is a good mixture of the salt and the ore easily obtained at the outset and maintained thereafter, but the whole of the chloridizing reagents, as vapor, come in most intimate contact with the fine ore dust descending the shaft. My opinion as to the possible economy in salt has been confirmed by the results since obtained at the Surprise Mill at Panamint. Here, with base ores assaying $75 to $90 per ton, 2½ per cent. of salt was found sufficient to give a chlorination of 92 per cent., and in practice only 2¾ to 3 per cent. was used.

With a high heat in treating lead ores, the bullion at the Auburn mill was seldom under 600 fine. In reworking the tailings (without roasting) the bullion was often only 75 to 80 fine, but afterward Mr. RIOTTE, I am given to understand, by first roasting these tailings, raised the fineness to over 500. At Panamint the bullion produced from "rather base" ores was from 960 to 980 fine. In experimenting with these ores and roasting them at a low temperare, bullion only 300 to 500 fine was obtained.

The lots of ore worked at the Auburn mill being of very varied character, the furnace was thoroughly tested as to its chloridizing capabilities. It in practice chloridized the silver to from 85 to 96½ per cent. The most difficult ores to treat were the oxidized ores containing lime. These needed an addition of sulphur in some form, but without this 85 per cent. was always obtained when proper care was exercised, the percentage rising from this to 88 or 89.

The best form in which to supply sulphur when required is that of pyrites. Mr. STETEFELDT has assured me that in common practice 1 to 1½ per cent. is sufficient. When pyrites cannot be obtained, KUSTEL'S method of burning sulphur outside of the furnace and conducting the fumes into the shaft would appear to be a good one.

Ores containing oxide and peroxide of manganese seem to give good chloridizing results even without sulphur. Cupriferous ores have generally given very good results. A considerable portion of the copper is volatilized. Mr. O. HOFFMAN found that with an ore assaying 12 per cent. in copper 22 per cent. of this metal volatilized into the condensing chambers, 10 per cent. remained as chloride and sub-chloride, and the balance turned into oxide. I have found at times much larger percentages volatilized.

Ores containing lead are generally considered the most difficult to roast, yet we obtained very good results. The main trouble was the caking of the mass at the bottom of the furnace. With a constant and strong heat from 10 to 50 per cent. is volatilized. Ore containing 8 to 10 per cent. of lead (as sulphide) gave me the highest results of any treated. A lot of 40 tons of this kind chloridized to an average of 94½ per cent., commencing at 90½, then rising to 95, and reaching 96½. This average is the one obtained from all the numerous tests made of the samples taken for the guidance of the foreman. It may be relied on, and is, I think, as good an average as can be shown anywhere. Mr. HOFFMAN found that the addition of a little charcoal prevented any calking of ores rich in lead, the charcoal exercisln only a mechanical action.

Ores containing 10 per cent. of zincblende, and even more, have been worked without trouble. Of the 40 tons just spoken of, about three-quarters, if I remember aright, contained 9 to 10 per cent. of zincblende, and had been sent to us because the shipper had failed to get any satisfactory results previously. (These figures are from memory. My notes and assays here are lost.) Another lot holding a large percentage of zincblende chloridized to over 90 per cent.

The fine dust in the flues was always well chloridized. The ores shipped to the mill generally held no gold, but a few tests with rock holding a little of this metal showed as much gold in the flue dust as in the shaft pulp. The percentage extracted I do not now remember. I have been told by Mr. STETEFELDT that in comparative tests made at Twin River from ore roasted in his furnace about 85 per cent. of the gold was obtained, while from the same ore roasted in a common reverberatory furnace only about one-quarter of this amount was extracted.

Amalgamation.—The amalgamation of the ores did not correspond with the results obtained in the furnace. In some instances very good returns were obtained, and I think that a lot of 100 tons, worked for the Mineral Hill Company, yielded considerable more than 85 per cent. of the assay value. But the general yield was not over 80 per cent.

This result was due evidently to the imperfect working of the pans. The pulp was hardly ever of the proper consistency, being too thick in the commencement, and too thin at the end. The charges were worked for 6 hours generally, in small Wheeler pans holding about 800 lb. There was often a deficiency of quicksilver, and the pans were usually in poor condition. One reason for this state of affairs was the existence of a Board of Trustees in London, which tried to manage the mill from that distance, and considered it economy to spend nothing in the way of repairs or quicksilver.

The tailings often showed 10 to 15 per cent., and more, of the silver in them as a chloride. Whenever there was a lack of ore and a sufficiency of quicksilver, they were worked over, but as no account of the amounts was kept, I can give no percentages. Mr. RIOTTE has since worked these tailings, roasting them before amalgamating, and can probably give interesting results. I understand that he extracted about 80 per cent. of the assay value, and obtained a bullion 500 to 700 fine.

The amalgamation results have been better in other mills, as at Austin and Panamint, so far as I can learn. At Panamint the extraction by amalgamation was generally 2 per cent. below the chlorination. At Austin the results have been less regular, for some reasons unknown to me, sometimes even exceeding the chlorination, sometimes falling 5 per cent., and in one case, July, 1874, nearly 9 per cent. lower.

It would seem very probable that humid extraction might profitably replace amalgamation in connection with this furnace. With this view I made a few tests of several tons at the Auburn Mill, and obtained favorable results as regards yield and fineness of bullion produced. Similar results have attended like experiments at Austin. But I believe that amalgamation is still retained universally north of the Mexican boundary.

One point more I mention with considerable hesitation. Out of three tests, two showed the presence of silver in the water coming from the pans. I have no knowledge of silver having been found thus in solution at other mills. I mention the fact here merely to call attention to the matter. At the time *a large amount of salt*—10 per cent. I think—was being used with the ore. I commenced a series of experiments subsequently, in order to test the subject, but the mill was closed down, and in the excitement attendant on the occasion, the sheriff managed to get hold of the vessels holding the test liquor, and, by upsetting them, upset the experiment very effectually.

Expenses.—What the cost of working ore at the Auburn Mill actually was, I am unable to state. The receipt of custom ore was very irregular, the mill was out of repair, so that only a part of the machinery could be run steadily, and the tailings were worked and reworked without any account of the amounts being kept. Still I will venture on an estimate of what could be done at this mill, based on the following general data, and applicable to conditions then actually existing.

The mill works rich custom ore at an averge of 16 tons per day. It is situated about 2 miles from the railroad. The ore is received in small lots, keeping the assayer busy. The superintendent is obliged to travel considerable of the time, in quest of ore, thus requiring a bookkeeper.

General expenses include salary and traveling expenses of the superintendent, salaries and expenses of a bookkeeper, a foreman, a hostler, a horse and wagon, and the office.

Assaying: An assayer, assistant, and assay office.

Hauling: 2 teamsters, 2 wagons, and 6 horses.

Sampling and crushing: 4 samplers and dryers, 2 battery feeders, castings, oil, etc.

Roasting: As before given.

Amalgamating: 2 amalgamators, 2 retorters and boiler men, 1 blacksmith, fuel, castings, quicksilver, oil and lights, general repairs.

The cast of working per ton may be estimated as follows:

General	$2.40	Roasting	$3.56
Assaying	1.23	Amalgamating	4.37
Hauling	0.92		
Sampling and crushing	1.52	Total	$14.00

Modifications of the Furnace.—The furnace at Reno has always been very successful, although the first built. In furnaces constructed after this, some modifications have been made which it may be of interest to name in this connection.

The next furnaces, after the one at Reno, were those at Austin, Mineral Hill, White Pine, Belmont, Pioche, Pinto, and Troy. These were furnished with gas generators (in place of the simple wood fire-places), and it was at first intended that charcoal alone should be used in these as fuel. But at Austin, it was found more economical to use wood, cut in small pieces, together with the charcoal in the proportion of one or two of wood, to one of charcoal. It was found, also, that the use of wood in this manner gave with some ores better chloridizing results, an effect attributed to the generation of steam in the fire gases, and thus a better formatiom of HCl. But, although the generators always produced a steady heat and a good clear flame when properly managed, yet the difficulty of handling them with unskilled labor, and the inability of the management, in many cases led to a general return to the simpler wood grate. At Austin, no trouble was experienced, and the gas generators were retained, so far as I can learn.

Then, the grate for wood fires was placed lower than before, and an air slit introduced above the arch of the fire-place, so as to effect a complete burning of the flame, and introduce an excess of oxygen for desulphurizing purposes. Thus, I am told, with proper care, as regular a fire is obtained as from the gas generators.

Still later, the height of the shaft was increased 10 feet where the ores worked were very base. The latest plan I know of, shows a distance of 26½ feet from the fire-bridge to the top of the shaft. An automatic feeder, now generally used, dispenses with the labor of one man per shift.

In order to cheapen the construction, one fire-place only is built for small furnaces—those with a capacity of about 16 tons. The furnace at Belmont was constructed in this manner, and, I am told, gives good results as to the chloridizing action, but with the effect of driving the descending ore rather too much to the opposite side of the shaft, so that it descends somewhat unevenly. A similar furnace near Homansville, Tintic District, Utah, is said to do very good work. Still I am inclined to believe that the economy in construction and fuel will, in the long run, be counterbalanced by a more imperfect furnace action.

The size of the auxiliary fire-place has been increased so as to obtain a higher heat here, and a more perfect chlorination of the finest dust. A sample of this very fine dust, taken from the bottom of the draft chimney at the Surprise Mill, Panamint, was chloridized to 96 per cent.

The last modification of which I have heard is an automatic discharge, by means of which the ore is kept hot a longer time at the bottom of the shaft, and none is withdrawn which has but recently dropped down the furnace.

In conclusion, I add a very examples of the working of the furnace, which, I hope, may be of some interest.

Mill.	Date.	Tons treated daily.	Total tons worked.	Chlorination percentages. Highest.	Lowest.	Average.	Authorities.
Manhattan, Austin.	Jan—Aug. '74.	27¼	4351¼	91.7*	89.0*	90.4	A. TRIPPEL.
" "	Jan—Sept. '75.	..	....	92.8	89.8	91.3	A. TRIPPLE.
Surprise, Panamint	1875—1876.	23	5000	96.2	89.0	92.0	C. WEBERLING.
Auburn, Reno.....	Oct. 1872.	16	40	96.5	90.5	94.5	A. D. HODGES, Jr.

* Monthly averages.

A. D. HODGES, Jr.

DAYTON, Nevada, July, 1876.

OFFICERS OF THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

THE American Society of Civil Engineers, at their 24th annual meeting, held on November 1st, elected the following officers for the ensuing year: President, GEORGE S. GREENE; Vice-Presidents, ALEXANDER L. HOLLEY and THEODORE G. ELLIS; Secretary, G. LEVERICH; Treasurer, JOHN BOGART; Directors, J. J. R. CROES, W. MILNOR ROBERTS, WILLIAM H. PAINE, JAMES O. MORSE, and M. N. FORNEY.

NORTH SHORE LAKE SUPERIOR SILVER MINING.—Our special correspondent reports the striking of very rich ore in the Duncan Silver Mine, though the best of the ore will not be reached until after the close of navigation. There are reports of rich ore finds in the Pigeon River District. The mines are worked by American parties from St. Paul. Information of what has actually been found is difficult to obtain, but the rumors are large.

THE WATER GAS QUESTION.

TO THE EDITOR: SIR—Allow me to present you a few figures relating to the economy of using water-gas as a fuel, provided it could be obtained at the cost named in your article of November 4, viz.: 15 cents per thousand cubic feet. According to the analyses given, 1,000 cubic feet of the gas consists of 660 cubic feet hydrogen, and 340 cubic feet carbonic oxide. If 1 cubic foot of hydrogen weighs 0·00559 lb., as given by RANKINE, and 1 cubic foot of carbonic oxide weighs 0·07814 lb. (its density compared with air being 0·96799, as given in WATT'S Dictionary, and the weight of a cubic foot of air being 0·080728 lb.), the 1,000 cubic feet of water gas consists, by weight, of 3·6894 lb. hydrogen, and 26·5676 lb. carbonic oxide.

The heating power of these gases, according to FAVRE & SILBERMANN, is, hydrogen, 62,000, carbonic oxide, 4,325. For the heating power of 1,000 cubic feet of water gas, we have then—

		Heat units.
H	3·6894 lb. × 62,000	= 228,743
CO	26·5676 " × 4,325	= 114,905
	Total.....	343,648

all for 15 cents.

Compare this with a ton of anthracite coal, say 2,000 pounds, costing $5.00. Heat units per pound, 13,500, (MORIN & TRESCA), total 27,000,000, or 78.57 times as much as there are in the 1,000 cubic feet of water gas. The water gas equivalent in heating power to 2,000 pounds of anthracite coal will therefore cost 78·57 times 15 cents, or $11.79. *Will it pay?*

Your correspondent, Mr. DWIGHT, remarks that "not more than one-tenth of the actual heat units of coal" are "utilized by the ordinary methods." The fact is that some steam boilers have been found to utilize 75 per cent. of the theoretical heating power of the fuel used in them, and 70 per cent. is a common figure. (See Report of Steam Boiler Trials at the American Institute, 1871. Trial of the Howard Boiler, Van Nostrand's Magazine, 1876, etc.)

The great lack of efficiency of the steam engine is undeniable, but this is not due to the boiler, nor to the fuel used in it, and it is a lack which the water gas fuel can be expected to remedy only to a slight degree, even if the theoretical heating power of any given amount of it should be as great as that of an amount of coal costing the same money.

Without disputing the advantages which are claimed for this gas over that produced by the Siemens process, it appears certain that its use for steam boilers, or for heating purposes generally (except possibly where great *intensity* is required), must be indefinitely postponed.

Very Respectfully, WILLIAM KENT.

STEVENS' INSTITUTE OF TECHNOLOGY, Nov. 7, 1876.

TO THE EDITOR: SIR—I have been very much interested by some notes on the Lowe Gas Process, by Mr. G. S. DWIGHT, which appeared in your last number, but I think the facts might be made plainer by a little additional information.

Analyzing the composition of the Lowe gas, which holds H 66
and CO 34
100 cubic feet,

we find that we have by weight, assuming the weight of one cubic foot of H as unity, of CO 34×14, 476 units containing of C, $\frac{476\times12}{28}=204$ units of weight,

and of O, $\frac{476\times16}{28}=272$ " " "

If we suppose that all this O comes from the steam injected into the fuel, it would imply the introduction of $272\times\frac{16\times2}{16}=306$ units of water, carrying $306\times\frac{2}{18}=34$ units of H. But as the gas holds 66 units of H, 66—34=32 units of H must have come from the fuel. This would give the proportion of H for 1000 parts of C in the fuel as $\frac{32\times1000}{204}=157$.

If, on the other hand, we suppose the fuel to hold, say, 40 units of O for every 1,000 of C, as it probably would, the fuel would contain 8· weight units of O, which would leave 272 —8 = 264 weight units of O to be supplied by the steam injected. This weight of O would correspond with $\frac{264\times2}{16}=33$ weight units of H, introduced in the form of steam, leaving $66-33\cdot=33\cdot$ units of H to be supplied by the fuel. This would imply that the fuel had $\frac{33\times1000}{204}=161$ units of H per 1,000 units of C.

Now, as the proportion of H per 1000 C rarely rises in any coals above 75, in anthracites (which I understand to be the fuel used in this case) above 35, and in petroleums above 185, one would infer, from the high proportion of H (viz., 157 to 161 units per 1000 of C), which this Lowe gas contains, that a very much larger proportion of petroleum had been used in preparing it, than is ordinarily needed in the Lowe process.

An examination of the following table, which Mr. DWIGHT gives, would lead at first sight, to a similar conclusion:

GAS YIELDED BY ONE TON OF COAL.

Process.	H	CO	CO_2	N	Total Volume.
					Feet.
Siemens.....	3 500	8,500	3,500	34,500	50,000
Lowe.....	33,000	17,000	.....	.....	50,000

In the Siemens gas the weight of the CO would be $8500\times14=119{,}000$, of which $\frac{119{,}000\times12}{28}=51{,}000$ units would be C.

The weight of the CO_2 would be $3{,}500\times22=77{,}000$ units, of which $\frac{77{,}000\times12}{44}=21{,}000$ units would be C.

The total C in the Siemens gas would thus be $51{,}000\times21{,}000=72{,}000$ weight units.

Similarly in the Lowe gas, the weight of CO would be $17{,}000\times14=238{,}000$, of which $\frac{238{,}000\times12}{18}=102{,}000$, would be C.

According to this the Siemens gas from a ton of coal would only contain 70·6 per cent. of the carbon which Lowe gas from a ton of coal would hold. Where does this extra carbon in the Lowe gas come from?

It is true that a certain proportion of the C in the Siemens gas is deposited in the form of tar in the cooling tubes. But this would hardly seem enough to account for such a great discrepancy; nor could it be accounted for wholly by a difference in the compositions of the coals used in the Lowe and Siemens producers, especially as our previous considerations would lead us to infer that, if the Lowe coal is very rich in C (and therefore poor in H), it must be accompanied by a very great proportion of petroleum, to account for the high proportion of H in the gas, which cannot come entirely from a coal which is rich in C.

The natural inference would seem to be that a considerably larger proportion of oil has been used in preparing this gas than is ordinarily used in the Lowe process—a conclusion which would be strengthened by the consideration that in the Siemens producer all the C of the fuel enters the gas (except a trifling amount deposited as tar), while in the Lowe process a certain proportion of C is consumed in heating the superheater, and does not enter the gas at all.

The discrepancy might be partly accounted for if the volume of the Lowe gas was measured under less pressure than that of the Siemens gas, a given volume of H or of CO of course weighing less under a low pressure than under a high one.

But as we must calculate the metallurgical value of gas strictly by the *weight* of its components, one would think that in either case the comparisons which Mr. DWIGHT draws between the two gases would show the value of the Lowe gas more clearly if they were somewhat modified, so as to show the weights of H, CO, CO^2 and N and the total weight of the materials from which they are derived in both processes.

Nevertheless, Mr. DWIGHT'S statement seems to show conclusively that gas for metallurgical and other manufacturing purposes can be made by the Lowe process much more economically than by the Siemen's producer, as for such purposes petroleum would be unnecessary. A ton of coal would give much greater calorific power and intensity by Lowe's process than in the ordinary way.

To make the subject clearer to metallurgists I would ask Mr. DWIGHT to tell us the exact proportions of coal and petroleum used in making a measured quantity of gas with the percentages of H, O, C and N which the oil, coal and gas contain, to enable us to check his calculations. HENRY M. HOWE.

TROY, November 8th, 1876.

ABSTRACTS OF LECTURES ON MINING.—No. XVII.

By Prof. W. W. Smyth, M.A., F.R.S., Royal School of Mines, London.

(From the London "Mining Journal.")

THE application of the wedge, if followed out into details, would be a very extensive subject, but its employment depends so much on local conditions and local experience that we can only here examine the matter quite generally. As one of the simplest uses of it we may refer to the breaking away of large masses of stone; and there is, perhaps, no more remarkable example of this use than can be seen at the famous Box quarries, near Bath. In some granite works, too, the application of the wedge to this purpose is maintained, and although in some details it varies somewhat from that adopted by the ancients, still on the whole the method has a very great similarity in both cases. In one respect, however, there was, probably, a difference—in the great use of steel tools in modern times, whereas it is a matter of uncertainty whether that material was used in those works. The manner of using the wedge will be governed by a knowledge of the tendency of the rock under treatment to split in certain directions; in the case of detaching a mass of rock from the face of a quarry, for example, a groove will be cut along the upper surface in the proper direction, and then a series of wedges driven in these, and another series along the floor of the mass. As the wedges are being driven in a certain interval will be left after each blow, in order that the force—or crack, as it were—may propagate itself. The object in many of these cases is to obtain the blocks without the use of gunpowder, which would shatter, and perhaps injure, the structure; consequently, the use of wedges is preferred.

Another plan is that of boring holes into the rock in proper position, and then inserting wedges of dry wood; these wedges are afterwards moistened, or left to the action of dews, &c. The famous French burr stones are obtained in this way by the use of wooden wedges. In the slate quarries wedges of various kinds come into play very importantly; and nothing, perhaps, is more striking than to observe in different quarries the different results which can be effected by the use of the wedge in the hands of skillful and experienced men, who know in which way the block may be expected to break. The blocks of slate are obtained from the quarry with the use of as little powder as possible, and after having been brought to a proper size will be split into wonderfully thin laminæ by the means of the wedge. Large masses of slate are broken into two parts previous to being split into laminæ, by cutting a groove on one surface, then turning over the mass and cutting a corresponding groove on the other, laying a piece of broken slate over the groove, and striking a powerful blow on this with a heavy sledge. The mass splits with a straight smooth section, but this depends in great part on the nature of the slate, some kinds not being able to be thus worked, as, for example, those which break with a more or less conchoidal fracture. There is a considerable variety in the character of the tools used for wedging, according to the varying circumstances under which they are required to be used. The Cornish gad, together with a pick, is held by a handy man to be the most serviceable implement, where an unhandy man would think of using powder. The same is the case with those small German wedges, driven by a single-handed hammer. A skillful man will produce a wonderful effect with the tools, while an unskillful one would be thinking of blasting. When the ventilation is bad, or where there is cause to avoid the sinking of the rock, powder cannot be used, and the work must be done by tools; under other circumstances, however, we can have recourse to the more powerful agent. The district of St. Just and neighborhood is notable for the handiness of the men at single-handed work, and there a great deal of work is done, with the assistance of a class of wedges of a peculiar character, rendered necessary by the narrowness of the veins and galleries. They are noted for the employment of a couple of implements: one of them is the picker, a long flattish wedge, which can be inserted at arms length if necessary, and used partly as wedge, partly as crow-bar; the second one is of a similar character, and is called a holer. A somewhat similar instrument is found in other parts of Cornwall, and is of much use for working under water. In sinking a shaft it may be necessary to make a small cutting into the wall, in order to rest some ap-

paratus—perhaps heavy pumping apparatus—on; obviously powder cannot be used, since it would shatter the ground about, and render it anything but a firm and safe foundation; however hard it may be, it must be cut with a wedge of some kind or other. Corresponding terms in German mining are the *Schlagel*, answering to the hammer, and *Eisen* to the wedge.

Within the last few years much attention has been given to the question whether it is not possible to do without gunpowder in the getting of coals. For many years past it has come to be the general practice for the men to substitute blasting for the system of wedging described in the last lecture, and this especially if the coal be hard, the powder being introduced at the top of the coal after the mass has been holed at the bottom. It is an easier metho l, and, therefore, the men prefer it; but leaving aside the fact of the shaking of the coal, there is the question of the security; and there can be no doubt that during the last few years many catastrophes have resulted from its use. But where the men using their picks find that those who use powder get on faster and earn more wages, they are apt to say that they cannot get on without it, and the masters have, consequently, had to give way in many cases. The question, therefore, arises whether it is not possible by some improved form of wedge to obtain a much greater power than with the ordinary wedge, and one or two very admirable attempts have been made to solve this question. Amongst these may be mentioned those of Mr. BIDDER and Mr. J. G. JONES. Mr. BIDDER proposed to bore at intervals along the face of the coal a set of holes by means of a powerful auger, the whole being about 2 feet long and 3 to 4 inches diameter, and bored in a very short time—about 25 minutes. Into these holes were to be inserted a series of iron cheeks, and then a number of long wedges were to be forced in between the cheeks by means of a small Bramah press, which was constructed so as to be easily carried about by two men. The method suggested by Mr. JONES was to introduce a cylinder into the aperture at the top of the coal; from which cylinder a number of little pistons projected above and below. By means of the pressure of water, derived from an ordinary Bramah press, the pistons were made to project more and more, until at last the pressure was sufficient to force down the mass. By this plan, as also that of Mr. BIDDER, it was held that the coal could be got down without any trouble of holing at all. A number of engineers who visited this apparatus in action reported very favorably on it, but the lecturer was sorry to have to express a belief that up to the present time all these attempts have been unsuccessful. There are certain difficulties attending their use, and if they have been found successful in any particular district, it is because circumstances there have been particularly favorable. This is undoubtedly a great problem, and, if solved satisfactorily, would lead to the introduction of a very great safeguard into our collieries. The action of the pick would appear to be so simple that it ought not to be difficult to replace it by a machine, and in late years several machines have been so introduced for getting the coal, some on the principle of the pick, others on the principle of the saw. It is now about 30 years since, that an intelligent mine manager, Mr. PEASE, proposed an arrangement and set a machine to work for this purpose. The men, partly, no doubt, by way of derision, called it the Iron Man, and right glad were they when it fell to pieces. And many of the machines since brought forward have been treated very illiberally and with much opposition; and partly from this cause, partly perhaps from the nature of the machines themselves, one cannot at the present time point to a single machine working over a large area. Some of them have failed because they required so much time in getting into place and adjusted before work could be commenced, and other similar causes. Those introduced by Mr. FIRTH, Mr. LENNOX, etc., apply the pick principle, the pick being swung backward and forward, and the machine being moved forward a little after each blow, the whole traversing on rails in front of the coal. It could very soon cut a hole 3 feet deep, with a height of 4 or 5 inches, sometimes this height being obtained by two or three separate cuts of 1½ or 2 inches deep. There was a great saving of coal in this manner, which the miner would have cut away in the front of the hole, in order to get in conveniently to work the rest. Another principle on which some of them (as, for example, the Gartsherrie machine) are constructed is that of the circular saw; a chain carrying a series of small cutters running round a wheel, and being carried along the face of the coal. We cannot compare these different machines one with the other until they have all been tried in a similar kind of coal; their use is so local at present that we can only regard them so far as experiments on a large scale.

We come next to the subject of dealing with ground of a harder character, where some of those objections to the use of gunpowder do not occur, where it does not matter about shattering the ground more or less, and where no fiery places are present. We must examine the implements used in preparing the holes for the blasting purposes, and at the outset we may draw a considerable distinction between those which are intended for use in places where there is plenty of room and those to be used in restricted spaces; and between those to be used for bore-holes almost entirely vertical, and those for horizontal ones. The introduction of gunpowder for these operations of blasting in mining is but of very recent date in this country—late in the 17th century. It was first employed at what afterwards became the famous Ecton Mines, in North Staffordshire, and for a long time it only partially supplanted the use of wedges. It was proposed at Freiberg in 1613, but was not employed till 1632, and then its use was for a long time confined to Saxony and the Harz. At first it was only employed to take down masses of rock which were partially freed by other means; there was no idea of taking down the whole mass by a succession of blastings. The introduction of powder has been one of the greatest boons the miner has received; it has not merely enabled him to make more rapid progress, but it has led generally to larger levels, larger workings, and also, in a surprising degree, to a better system of ventilation, and, consequently, to the improved health of the men. Still we must not forget that very much good work was done before the introduction of powder, and in some of the old workings—as those of Derbyshire—we can see signs of the skilful manner in which a good workman could handle his pick; beautiful smooth surfaces, with a pattern of parallel curved line, perfectly regular, formed by the strokes of the implement. Among the tools used for making these holes we have, first, a long iron bar, with a cutter at each end; the bar is 5 or 6 feet long, with a swelling toward the middle, for convenience of holding, and for giving sufficient weight to the tool. It is called a jumper, or borer, or augur, and is employed for boring holes, vertical or inclined, at a small angle only. One end of the cutter is commonly wider than the other, so that you can commence a hole with the wider one, and then after a certain distance, or on meeting with a small obstacle, may continue it with the other end. It is raised a certain distance by the hand, and then allowed to fall, and the fragments of broken rock are removed by having the hole full of water, or the larger ones by means of a small tool called the scraper; or it may be with a pair of simple tongs, having the arms closed by means of a ring at the end of a moveable bar. In most mining operations in nearly all districts, the common instrument is a boring bar, called in the south-west districts a borer; in other parts a drill, mandril, augur, or jumper; or, again, in Germany a *Bohrer*, in France a *fleuret* or *pistolet*. It consists in the main of a bar of iron or steel, with a cutter at one end, and the other end intended for receiving blows from a hammer.

When this institution was first opened for purposes of instruction the bars universally employed were of best bar iron, tipped with double shear steel at each end; since that time a wonderful change has taken place, and bars now being made entirely of cast-steel, the chief points to be looked to are that the bit is not beaten out too fine, according to the nature of the ground, the form of the bit, and the angle a transverse section would present. The form of the bit varies; sometimes it has nearly, or quite, a straight edge, at others it is much curved. Almost universally now the bit is single, but formerly it was the custom to use swallow-tailed bits. The sharpness of the edge will vary according to the nature of the ground; and sharp tools used in the limestone of Derbyshire would not stand two blows from the hammer in rock like that ordinarily worked in Cornwall. The borers of Cornwall and Devon are but little curved, and the transverse section shows a very obtuse angle. In the old iron tools the steel bit was welded on in different forms. It was observed in Derbyshire, and in the mining district of Mansfeld, that a tool entirely of steel transmits the blow from the hammer to the cutting part better than an iron tool, and that there was considerable advantage in employing the steel tools, with the disadvantage of a greater prime cost. In some cases within the lecturer's knowledge, the wages of the men had been economized 10 per cent. by giving them these cast-steel tools. The bars of the borers are usually of an octagonal rather than a round form, for the greater convenience of turning it by the hand between each blow, so as to cut fresh ground each time, just as in the case of the deep borings. The diameter of the borers in single-handed borers is from 1 to 1¼ in.; of double-handed borers 1½ to 2½ in., or even larger, but then special hammers have to be employed, and, perhaps, three instead of two men to strike. A long series of experiments have been made to determine whether it would not be an advantage to put in a number of smaller bore-holes than those mentioned above; these small ones could, of course, be made more rapidly, but the reduction of the effect of the powder has caused them to be considered unsuccessful. Neither has the method of putting down small holes first, and then enlarging them, met with remarkable success.

A HISTORY OF THE BESSEMER MANUFACTURE IN AMERICA.*

By R. W. Hunt, Troy, N. Y.

THE memorable features of American history have been making fast during the last century, and notably so since 1860; and they are by no means confined to political or to any one branch of scientific development. Of all the industrial arts, none show a greater change, or a mightier progress than the Bessemer manufacture. And in this year, while we are celebrating the first Centennial of our national life, we can also celebrate the first decennial of American Bessemer practice. While not forgetting or undervaluing what has been done in other countries, I have thought that a brief history of the introduction and development of the Pneumatic or Bessemer process in America, would be of interest.

In 1863, the Kelley Pneumatic Process Company was formed, and an arrangement entered into with WILLIAM KELLEY, who had taken out Letters Patent of the United States, Nos. 16,444; 17,628 reissued as 505; 18,910, dated Jan. 10, 1857; June 23, 1857; Nov. 3, 1857; and Dec. 22, 1857 respectively. This association was composed of the Cambria Iron Company, E. B. WARD, PARK BROS. & Co., LYON, SHORB & Co., Z. S. DURFEE, and later, CHOUTEAU, HARRISON & VALLEE joined the combination. Not satisfied with possessing the control of the Kelley patent, they sent Mr. Z. S. DURFEE to England, to secure for this country MUSHETT's patent on recarburization, No. 17,389, dated May 26, 1857, the same having been taken out in England, on Sept. 22, 1856. In this he was successful.

Previous to the application of WILLIAM KELLEY for a patent, HENRY BESSEMER, of England, had taken out patents dated Feb. 12, 1856, and Aug. 25, 1856, in this country. KELLEY claimed priority of discovery of the principles of the process, and the Patent Office allowed his claim by granting him his patents.

In the Autumn of 1862, Mr. ALEXANDER L. HOLLEY, while in England, was impressed with the importance of Mr. BESSEMER's invention, and so fully foresaw its future, that upon his return to the United States, he induced Messrs. JOHN A. GRISWOLD and JOHN F. WINSLOW, of Troy, N. Y., to join him in endeavoring to possess Bessemer's American Patents. Mr. HOLLEY returned to England in the Summer of 1863, but not until the Spring of 1864 did he succeed in purchasing for Messrs. WINSLOW, GRISWOLD & HOLLEY, the desired right.

Thus, at about the same time there were two separate and distinct organizations seeking to control the future of the then undeveloped industry. While Mr. DURFEE was abroad, his company determined to erect experimental works at Wyandotte, Michigan (where one of their members, Capt. E. B. WARD, owned extensive iron works), with the view of testing the adaptability of American irons to the new process.

Mr. WILLIAM F. DURFEE undertook the erection of the plant, and located it in the casting house of the Eureka Blast Furnace, intending to take the metal direct from the furnace. He put in a 2½ ton vessel with a long narrow casting pit, and arranged a system of rotary steam engines to hoist and pour the melted iron into the converter, and to rotate the latter. As Mr. DURFEE was instructed to avoid as far as possible BESSEMER's mechanical patents, he was very much hampered in designing his plans. But it was in these works in the Fall of 1864, under the direction of Mr. WM. F. DURFEE, that the first Pneumatic or Bessemer steel was made in America.

Mr. Z. S. DURFEE brought with him on his return from England, Mr. LEWELLEN M. HART, who had acquired some experience in the business at the French works of PETIN, GAUDET & Co. Upon the arrival of Mr. HART at Wyandotte, he decided to build a reverberatory furnace for the purpose of melting the charges of iron, and so enable him to use a mixture of English and American irons, and it was from metal melted in this furnace that all the steel made by him at Wyandotte was produced. The works remained under this gentleman's charge until the beginning of 1865, when he severed his connection and went to Troy, N. Y., entering the service of Messrs. WINSLOW, GRISWOLD & HOLLEY, and subsequently going to the Pennsylvania Steel Works at Harrisburg, Pa., and later leaving their employ to engage in other business in Philadelphia, where he died.

In March, 1865, IGNATIUS HAHN assumed charge of the Wyandotte Works.

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, June, 1876.

This gentleman had lately arrived from Prussia, where he had been connected with the works of KRUPP, at Essen. He conducted the works until July 4th, 1865, when he resigned his position. As Mr. HAHN's retirement left the Company without any practical steel maker, and the works had thus far been conducted on an experimental basis, the proprietors determined upon making the most hazardous experiment of all, and put them in charge of the writer, who had gone there a few weeks before in the interest of the Cambria Iron Company. In accordance with this arrangement the writer made his first "blow," and by some strange fatality happened to "turn down" at just the right time.

In the Fall of 1865 the reverberatory furnace was torn down, and thereafter, during the continuance of the works, the iron was taken direct from the blast furnace; excepting that which was sent to the works to be tried experimentally, and which was melted with anthracite coal in a MCKENSIE cupola, this cupola having been put up by the writer during the Summer of 1865.

In October, 1865, the first heat of Bessemer steel made from Missouri Iron Mountain Pig was blown by the writer, having been melted in this cupola, and the resulting steel was extremely satisfactory.

During Mr. HAHN's administration Mr. Z. S. DURFEE made several attempts to convert iron melted in the small cupola of a foundry attached to the works, and located on the opposite side of the furnace casting house. But owing to the cupola being so small, thus requiring the iron to remain so long in the accumulating ladle, and then run so far in an open runner into another ladle and be hoisted and poured into the converter; and containing so low a percentage of silicon, each trial was a failure. But I believe this was the first attempt to utilize the cupola as a melting furnace for the Bessemer process. At all events it certainly was the first time it was tried in America, and of its ultimate success Mr. DURFEE was fully convinced. Mr. HOLLEY must have been impressed at about the same time with the same idea, for the records of the Troy Works show that on July 20, 1865, the cupola was there used for the first time and with complete success.

The writer remained in charge of these works until May 14, 1866, when he turned them over to Mr. A. S. AUBREY and returned to the Cambria Works, that company then intending to at once erect Bessemer works.

During the year 1865 Captain WARD bought the works from the KELLEY Process Company, and they were thereafter conducted entirely in his interest, and after many alterations finally abandoned in 1869.

Upon Mr. A. L. HOLLEY's return from England, in the Spring of 1864, he at once commenced the erection of a 2½ ton experimental plant at Troy, N. Y., for the firm of WINSLOW, GRISWOLD & HOLLEY, and started it February 16, 1865. While at the Wyandotte Works steel was made at an earlier date, the Troy establishment was the first to bring the process near to a commercial success. Not having been personally connected with these works during those early days, I cannot so fully realize the doubts and difficulties through which they passed, but I do know from a Wyandotte, to say nothing of any later experience, that it has required faith made perfect to carry one through the sea which seemed to be bounded by no shores. As I have often expressed it, if we, knowing there was a way through all our troubles, felt so hopeless, what must have been BESSEMER's pluck to enable him to persevere through his difficulties, when the desired end was known only through faith? But before entering upon a chronological detail of subsequent works, I must here state, that after building the first experimental plant at Troy, Mr. HOLLEY seems to have at once broken loose from the restraints of his foreign experience, and have been impressed with the capabilities of the new process. The result being that mainly through his inventions and modifications of the plant we, in America, are to-day enabled to stand at the head of the world in product.

But to return to the detailed history. As before stated, there were in 1865 the two rival organizations claiming control of the process in this country—the KELLEY Process Company, through their KELLEY and MUSHETT's Patents, and Messrs. WINSLOW, GRISWOLD & HOLLEY, through their BESSEMER and HOLLEY American Patents. Both parties fel strong in their respective positions and in possessing the necessary means to maintain them. But after spending large sums of money in counsel fees, they wisely concluded that their fight would at best be a "Kilkenny cat" one, and so early in 1866 they combined their respective interests, the BESSEMER, or WINSLOW, GRISWOLD & HOLLEY, party taking 70 per cent., and the KELLEY Process Company 30 per cent. of all royalties collected. To this wise compromise may we attribute the subsequent establishment of many works. Under this organization, Messrs. JOHN F. WINSLOW and JOHN A. GRISWOLD, of Troy, N. Y., and DANIEL J. MORRELL of Johnstown, Pa., were elected Trustees, and they appointed Mr. Z. S. DURFEE as their General Agent.

But great difficulty was even yet experienced in inducing capitalists and manufacturers to attempt the introduction of the new manufacture. While the metal produced was wonderful in its qualities, still the necessary first outlay was so large, and the details of the process were so uncertain, and the time-honored prejudice against anything new, held such powerful sway, our people hesitated, doubted, and waited. Wonderful tales came to us of what was being done abroad, and some venturesome railway managers even dared to import and place in their tracks trial lots of foreign Bessemer rails. Messrs. WINSLOW, GRISWOLD & HOLLEY had, from the very first erection of their works, wisely pursued the plan of extending every facility to blast furnace owners, in all parts of the country, to have their irons tried for steel; and under this system many brands were tried and most found wanting. These failures to obtain good results, of course built up still greater barriers against the spread of the process. In the light of our present chemical knowledge of the manufacture, it is amusing to think of firms sending a few tons of iron to Wyandotte, Troy. or even England, to be tried in actual practice, when a few hours of laboratory work would have settled the entire question. But still it was this very blind using of unknown irons that first opened the eyes of steel makers to the possibility of making good product from metals pronounced unfit by the then authorities.

The records of the Troy Steel Works show that on March 1st, September 26th, November 22d, and November 30th, 1864, trials of Wassaic, Copake, Fort Edward, Hudson, and Crown Point irons were made, in HENRY BESSEMER's 1½ ton vessel, with the following results given in the column of remarks. Of Wassaic, "slopped over badly but hammered very well, very hard and not very ductile, small ingot reheated when hot from mold, and crumbled under the hammer." Copake "slopped some, hammered tolerably well, harder and less ductile than Wassaic." Fort Edward and Hudson, "worthless and crumbled under the hammer." Of Crown Point, 1st trial, "a little sloppy, very ductile, pretty soft, no cracks;" 2d trial, "blew well with moderate blast, very good." The earlier of these were, undoubtedly, the first trials made of American irons.

Acting, I presume, upon these results, I find that the first conversion made at Troy was from Crown Point charcoal iron. The first at Wyandotte, having been from Lake Superior charcoal, direct from the blast furnace, The success of the Troy Works, whenever good metal was used, encouraged the proprietors to commence the erection of new works on a more extended scale, and early in 1867 Mr. HOLLEY completed the new or five-ton plant, Mr. JOHN C. THOMPSON, then being superintendent of manufacture. Mr. HOLLEY, at this date, assumed personal charge of the Pennsylvania Steel Works, having previously furnished plans for the machinery, and Mr. THOMPSON, soon after, of the Cleveland Works.

Mr. Z. S. DURFEE then entered upon the management of the Troy Works. He built the forge, and made some alterations both in plant and details of manufacture. Among other things, he adopted for the small or experimental plant, the practice of melting the recarburizing metal in crucibles, and obtained most excellent results. At this time the capacity of the works was stated to be forty tons of ingots per day, but the records of the works fail to show any such actual results.

On October 19th, 1868, the roof of the five-ton plant caught fire, and was almost completely consumed, destroying much of the machinery. Soon after Mr. DURFEE resigned his connection with the works, and Mr. HOLLEY once more became the manager, the property having been possessed by the firm of Messrs. JOHN A. GRISWOLD & Co., Mr. JOHN F. WINSLOW selling to them his interest. Upon rebuilding, Mr. HOLLEY availed himself of his Harrisburg experience, and remodeled the works in a great degree—particularly as to the melting, or cupola house, and the blowing engines. The first blow was made in the rebuilt works, on January 12th, 1870. The small plant had been running most of the time, while the large works were being rebuilt. The ingots produced at these works, up to January, 1871, had either been hammered in the forge, or bloomed from nine-inch ingots, at the Rensselaer Rail Mill, and the Spuyten Duyvil Rail Mill, and then rolled into rails at these respective establishments. In January, 1871, Mr. HOLLEY had a thirty-inch three-high blooming train ready to run, having located it in the forge, and using the hammer already there to cut and chip the blooms as they came from the rolls. The mill was provided, front and back, with lifting-tables, containing loose rollers, and raised by hydraulic power. The rolls were turned to receive twelve-inch ingots, which were cast heavy enough to make two rail blooms. These ingots, after being placed on the rollers of the front table, were pushed into the rolls, both front and back, by hand; it requiring the power of eight men to operate the mill. The train was built with the top and bottom rolls stationary, and the middle roll moved up and down by four screws running through the bolsters, carrying the necks of this roll, these screws being rotated by friction gears, which were driven by a belt off the main shaft of the mill engine, and operated by a lever at the end of the rolls. This mill proved to be a great advance upon the old practice, and ran until the Fall of 1872, when GEORGE FRITZ's Patent Driven Tables and Pusher were added. By the use of these tables the force was reduced to four men, or, rather, three men and a boy. The works continued steadily running after being rebuilt, Mr. HOLLEY relinquishing the management in 1871, but still retaining a connection as consulting engineer, which position he still holds. He was succeeded by Mr. BARNEY MEE, who died February 11, 1872. His place was filled, for a short time, by Mr. JOHN C. THOMPSON returning to the scenes of his first experiences, but his health failing, the works were without a head until October 1, 1873, when the writer assumed control. Mr. J. WOOL GRISWOLD has been in direct charge since May 1st, 1875. On March 1st, 1875, the firm style was changed to "The Albany and Rensselaer Iron and Steel Company."

I must be permitted to mention, as an amusing incident, and as showing how little we can foretell what time will bring forth, that in 1865, while connected with the Wyandotte Works, I called, in passing through Troy, at the steel works, and presented a letter of introduction to Mr. HOLLEY who, in the gracious manner of which he is so capable, most blandly, but equally firmly, declined letting me inside the works, and with the best grace possible under the circumstances, I bowed myself out of his presence. Ten years later I am in charge of the works, proud to consider Mr. A. L. HOLLEY my most intimate friend, and very careful to frequently remind him of our first interview. These works are now producing about 1,300 tons of ingots per week, which is sufficient to keep the rail mill running double time. Their largest month gave a yield of 5,498 gross tons.

The Pennsylvania Steel Works were the third Bessemer works started in the United States. The company was organized under the Presidency of S. M. FELTON, Esq., and under the auspices of such prominent railroad men and engineers as the late EDGAR THOMSON, NATHANIEL THAYER, M. W. BALDWIN & Co., WM. SELLERS & Co., BEMENT & DOUGHERTY, R. P. PARROTT, H. R. WORTHINGTON, MERRICK & SONS, MORRIS, TASKER & Co., and others. Upon the first organization of the company Mr. WILLIAM BUTCHER, of Sheffield, England, was elected as the engineer, and ground was broken, but, later, other arrangements were made, and the works were built upon plans furnished by Mr. A. L. HOLLEY, and on January 1, 1867, that gentleman severed his connection with the Troy Works, and, removing to Harrisburg, assumed entire charge of the construction, being assisted by Mr. H. S. NOURSE. In June, 1867, the Bessemer works were first started and have been ever since in constant operation. The rail mill of the company not then being completed, most of the ingots were rolled into rails at the Cambria Iron Works, Johnstown, Pa., this arrangement lasting until May, 1868. I find it stated in an official publication of July 27, 1868, that the "annual capacity of the present Bessemer plant (two five-ton converters) is about ten thousand tons, and of the rail mill thirty thousand tons. Additional converters will be erected from time to time." The time for such additions has not yet arrived, but the product has been increased fully five hundred per cent. The heaviest day up to date having been 281; week, 1,291; and month, 5,455 gross tons.

The writer had charge of the rolling at Cambria of the Pennsylvania Company's steel, and well remembers with what proud satisfaction Mr. HOLLEY visited Johnstown and proclaimed to us all that at last his dream was realized and the Pennsylvania works were making four conversions on each turn, or eight per day, producing forty tons of ingots. I presume that "official document" was inspired just about this time. In May, 1868, the rail mill was completed, and since then the company has taken care of their product at their own works. At first they pursued the same plan under which their steel had been rolled at Cambria, but subsequently introduced hammering, two hammers having been originally put down for forging purposes, and have up to the present time drawn the ingots into rail blooms under them, but are now erecting a blooming mill which is being constructed by Mr. JAMES MOORE at Bush Hill Iron Works, Philadelphia.

Upon Mr. HOLLEY relinquishing the management of these works in 1868, he was succeeded by the joint management of Mr. NOURSE and Mr. JOHN B. PEARSE. This arrangement was in turn succeeded by another by which, in 1870, Mr. PEARSE took charge of the company's business as general manager, Mr. NOURSE remaining as superintendent. Mr. L. S. BENT is now in charge of the works.

The first ingots made at Harrisburg and sent to Johnstown to be put into rails were drawn into blooms under a five ton hammer. A limited number were also hammered at the works of SEIFERT, MCMANUS & Co., Reading, and the blooms sent to Cambria. While watching the behavior of the steel under the hammer, Mr. GEORGE FRITZ, chief engineer of the works, became convinced that it was not the proper manner of treating the material, and he and Mr. HOLLEY had many consultations on the subject. Mr. FRITZ at once turned up a set of blooming rolls which he placed in a 21 rail train, and Mr. HOLLEY caused 8¼ inch ingots to be cast and sent him. These were drawn to 6½ inches square, and then recharged and wash heated, and then rolled into rails. So well did this work, that Mr. HOLLEY adopted it in the Pennsylvania company's mill, which he was then building. After many discussions and consultations he decided on his return to Troy to build the heavier blooming mill to which I have before referred.

The Freedom IRON and Steel Works, near Lewistown, Mifflin County, Pa., were the fourth Bessemer Works started in this country. They were organized under the Presidency of Mr. JOHN A. WRIGHT, and absorbed the interests of the Logan Iron Company, which company had been established, and successfully working for years. Mr. WRIGHT visited England, and made purchases of the most complete machinery there known, and with the exception of the blowing engine, which Messrs. I. P. MORRISS & TOWNE, of Philadelphia built, the works may be said to have been of English construction and arrangement. The company intended to manufacture principally boiler plates and tyres, but the former mill, which was driven by a Ramsbottom reversing engine, was soon changed to a rail mill. The works were under the direction of Mr. R. H. LEE, and ran for about one year, when, owing principally to the unadaptability of the company's irons for Bessemer steel, the works were stopped, and much of the machinery subsequently sold. Their first blow was made May 1st, 1868.

The Cleveland Rolling Mill Company's Bessemer Works, situated at Newburg, six miles from Cleveland, were the fifth works erected. These were built after the same general plans as the Pennsylvania Works, but Mr. H. GMELIN, the engineer in charge of construction, made many modifications. This gentleman returned to Austria before the blowing in of the works, which task was assumed by Mr. JOHN C. THOMPSON, he making the first blow on or about October 15th, 1868. Mr. THOMPSON soon resigned the charge owing to failing health, and the works have since then been conducted by Mr. CHISHOLM. In a short time, a second pair of five ton vessels were erected and all four remained in operation until 1875, when the later pair were removed to make way for SIEMIENS MARTIN Furnaces which are now running.

This Company deserves credit as being the first parties in this country to make a commercial success of the application of Bessemer steel to wire, screws, and several other specialties.

TO BE CONTINUED.

THE MINERAL WEALTH OF SOUTHWESTERN VIRGINIA.*

By C. R. Boyd, Wytheville, Va.

WITHOUT attempting to do more than give a preliminary or skeleton report upon the geology and minerals of Southwestern Virginia at this time, I am led to hope that the great commercial importance of the sixty miles of cross-section here crudely treated of will be apparent to those who have not already rendered themselves familiar with that district. At the adjourned meeting in October next a fuller and more complete paper will be presented, which, it is hoped, will supply the most minute additional information that may be desired.

This sixty miles length of cross-section is located directly across what may be considered, in lieu of an exact instrumental observation, the central portion of the Apalachian chain in Southwestern Virginia; having its centre near Wytheville, Wythe County, Va., on the Atlantic, Mississippi and Ohio Railroad—a main stem running from Norfolk on the seaboard toward Memphis, St. Louis, and other Western cities. A remarkably valuable parallel cross-section situated 36 miles further E. N. E., which would have a centre nearly at New River Depot on the same railroad, passing across the same geological strata as the first, with the same extraordinary mineral characteristics in the main. The map and cross-section now on exhibition in the Centennial Committee Rooms of the Mining Engineers, No. 1100 Girard Street, Philadelphia, will give a very accurate general idea of the subjects of this paper.

The Southeastern end of the cross-section is located in Carroll County, Va., (which lies just south of Wythe County,) near the north-western limit of the gneissic system, marked by the eruption of a six-foot vein of trap, holding particles of native copper, which, occasionally, along the twenty miles length I have examined, presents interesting features, but requires a closer and much more critical inspection than I had time to give it in order to determine an approximate idea of its commercial value; my time being consumed in that vicinity by an inspection of the more interesting pyritous lode which lies but a short distance north of it. This pyritous lode is marked by extraordinary quantities of limonite, varying between 20 and 40 feet in depth by a width of from 60 to 150 feet, in many parts holding, according to Dr. F. A. GENTH, about 50 per cent. of metallic iron. It was first ascertained to be the mere outcrop or iron cap of a pyritous lode holding copper, by the precipitation of that metal on the iron and steel of the tools with which it was first mined for forge and foundry purposes; and, finally, when a few feet depth had been reached, by showing the green crystals of the carbonate of copper. Under the iron cap, marked in its lower part by carbonate of copper, which varies in quantity from one point to another, suggesting the idea that the vein alternates in richer and poorer copper ores, there is, as usual in such veins, a bed of the black oxide of copper, accompanied by copper glance, the vertical thickness of which, observed at two points, is, respectively, two feet and three feet; giving, as to its best ore, 51.53 per cent. metallic copper by Dr. GENTH's analysis, and 21.08 per cent. as to its poorer average. Next below are the pyrrhotite and copper pyrites, accompanied by actinolite and chlorites, and calc-spar in small quantities. The copper pyrites yield according to the same analyst, from a strictly poor average, 1.70 per cent. of metallic copper, and 9.36 per cent. from another average; leaving no doubt of the great economical value of the lode at a point on Chestnut Creek in Carroll County, where I had the best opportunity to examine it. Here the lode has a thickness varying between 45 feet and over 100 feet, inclosed in talcose and micaceous slates and schists, traceable, to my knowledge, through the county of Grayson, Va., and Ashe, Alleghany and Wautauga counties in North Carolina; to the North-east into the county of Floyd, Virginia, and reported further on.

In the same series of rocks may be included the Ore Knob Copper Company's mine, the Peach Bottom copper mine, with its silver-bearing galenite, and the Elk Knob copper lode, of Western North Carolina, as well as the bands of magnetic and specular ores, and the veins of mica, felspar and quartz so largely developed in that part of North Carolina. These last, copper and other veins, have been pretty fully explained by Dr. T. S. HUNT, Prof. KERR, Dr. GENTH, and others.*

Leaving the great copper lode of Carroll County, with its accompanying steatitic rocks, some ledges of which are pure enough for furnace lining, we take up our cross-section line to the N. N. W. again, through chlorite slates and kindred rocks of the Huronian period, synchronous with the Langmynd group, having a dip S. E. and S. S. E., varying between 45° and 90° from the horizon, we traverse about five miles of a repetition of these strata to where we strike the main ridge of the Unaka or Iron Mountain range projected north-east from Western North Carolina, Georgia, Alabama, and likely to give us those valuable measures of metallic veins by which it is characterized at other points further south, with some valuable additions as to our cross-section. At this point, we might say, or near it, the New River breaks through on its way toward the Kanawha, discharging about 1,500 cubic feet per second in usually low stages. This Unaka or Iron Mountain alone here marks the division, so far as observed, between the Huronian and Cambrian periods. In places along it, it is much disturbed, some times presenting the appearance of a much disturbed anticlinal; but generally having a dip to the south-east varying between forty-five degrees and higher; having a hard conglomerate near its centre, and in its north-western flank stratified veins of brown iron ores, the measured thickness of which at one point shows 6 feet and 9 feet for two of them, between head and foot walls of slate; which I place nearly about the junction of the Potsdam and Calciferous sub-epochs, judging from the proximity of known rocks, for no organic remains have as yet been visible to me at the point. From these veins, and others carrying manganese, immediately near, I conclude the immense beds of sedimentary ore of great purity in Wythe and Pulaski counties are derived in part. An analysis of these ores has been so frequently made, and they have been tested practically so often by a few iron men of the section, without finding any objectionable impurities, except as to ores from two or three isolated places, that I will postpone giving full analyses, and will add that the very curious may obtain valuable information as to minor constituents by referring to Messrs. BOOTH & GARRETT, chemists, and to Prof. FESQUIT, who have become very thoroughly acquainted with the iron ores of the New River region. I will say that in eight specimens taken from different points on New River, some from these mammoth beds, submitted to these gentlemen, they found an average of 53.68 per cent. of metallic iron, and 0.141 per cent. phosphorus; the highest phosphorus being 0.240 per cent. Four specimens of magnetic oxide gave an average of 65.062 per cent. metallic irons with 0.11 per cent. of phosphorus; two of the fragments giving no phosphorus at all. Three specimens of red hematite gave an average, by those chemists, of 65.90 per cent. of metallic iron, and 0.033 per cent. of phosphorus. It should be borne in mind that these specimens were taken from points on New River and near it, all the way from Grayson, where the river comes in from North Carolina, down to Peters Mountain in Giles County. Va., where it breaks through that mountain on its way toward Hinton on the Chesapeake and Ohio Railroad, and on to the Kanawha.

To revert to our cross-section line again: leaving the Unaka, or Iron Mountain, and going our old course N. N. W., we fall into the south-eastern border of what would be the great valley of Virginia prolonged, across which the New River cuts irregularly to the north-east, and having near it on each side much of the great sedimentary iron ore beds we have just been considering. We fall in a mile or so of the Unaka into limestones, both magnesian and non-magnesian, generally crystalline, and void of organic life; having a strike generally N. N. E., and a dip, which, for want of a better word, may be called heteroclinal, for the rocks are chopped about a great deal in places. In this series of rocks on the bank of New River we are at a forty-foot vein of lead and zinc, traceable for many miles E. N. E. and S. S. W., generally perpendicular in attitude, and just at this point owned and operated by the Wythe Lead and Zinc Mining Company, sometimes known as the Union lead mines and the Austin mines. The ores are sulphurets and carbonates of lead and zinc blende and carbonates of zinc, principally in a generally pure condition. This particular mine has been worked since some time previous to 1776, furnishing some of the lead used by the Continental armies, and a great part of that consumed by the Confederates east of the Mississippi in the late war. But, after the evidently great amount of ores has been removed, no mining has been done below water level. Over ten thousand tons of the zinc carbonates have been shipped north and converted into oxides, etc., since 1866. Following this great lode north-east or south-west on its course, you do not find it so well in hand as at the Wythe lead and zinc mines; at points it is thrust up in separate veins. A much closer inspection at several promising points may reveal it united to such an extent on the surface as to render it profitable mining; notably, two or three points west of New River, and another near Reed Island Creek, on the lands of GRAHAM & MCGAVOCK, where there is evidently a junction of it with a lode of pyrites of iron, of which I shall speak presently, and another point or two in Pulaski County, following down the course of New River in that part. These remarks above are as to the surface. There is great probability that deep mining will find many of these minor veins united into one of sufficient size to be of as great commercial value as it is at the Wythe lead and zinc mines.

Leaving the lead or vein, and crossing New River, on the line of our cross-section again, we pass over a narrow belt of lower limestone, through occasional beds of neutral brown hematite which line this valley for miles in each direction, we strike another belt of crystalline limestone, in which there is a lode of iron pyrites, not running in one regular line through the country, frequently broken and thrown off a regular course, twelve feet thick at the point I could obtain the best measure of it, and decomposed almost entirely in all the hills through which it passes, leaving an extent of nearly pure limonites along through the county of Wythe on Cripple Creek and near the New River that I have never attempted to measure. Near this lode, just west of where our cross-section passes, are very considerable deposits of manganese oxide, without any chance as yet to obtain accurate measurements, which, by the tests of Prof.

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting June 1876.

* It will be a matter of some interest to geologists visiting that section to examine the great granite mountains in Grayson County, Va., known as Point Lookout and Buck Mountain. They have the appearence, in places, of an entire want of stratification, strongly suggesting the idea that they belong to a much older series of rocks than those around them. It may be determined that in the projection of the sides of these ancient rocks those planes of least resistance were found that resulted in the great fissures, during the disturbance of the earth's crust, into which have been interjected some of those metalliferous lodes which I have attempted to describe. There is quite a similarity between the section and Cornwall, agreeably with some published accounts I have read; although they do not appear to be synchronous.

COOKE, of New Jersey, gave the following analysis: Weighed oxide of manganese, 79.6; black oxide of manganese, 66.98; of which there was available oxygen, 12.32; and metallic manganese, 57.21; iron, 0.65.

This ore was once analyzed specially for impurities, and no appreciable quantity was found in surface fragments. It should be tested at some depth below the surface. Near to this, to the north of it, is a measure of manganiferous iron ore four feet thick I can vouch for, and more that I could not obtain for want of developments; and to the south of this there is still another vein in the north flank of the Iron or Unaka Mountain that will be soon investigated.

[TO BE CONTINUED.]

INTERNATIONAL EXHIBITION OF 1876.

ADMISSIONS FOR THE WEEK ENDING NOVEMBER 9, 1876.

Date.		Paying Visitors.	Press, Complimentary, and Exhibitors.	Total Visitors.
Previously reported.....	.....	7,007,929	1,614,127	8,622,056
October 31.....	150th Day..	81,867	*12,500	94,367
Nov. 1.....	151st " ..	107,715	12,763	120,478
" 2.....	152d " ..	115,298	12,724	128,022
" 3.....	153d " ..	83,894	12,297	96,191
" 4.....	154th " ..	84,130	12,917	97,047
" 6	155th " ..	77,936	12,381	90,317
Totals.....		7,558,769	1,689,709	9,248,478

* Estimated.

MR. ANTON EILERS, late Deputy United States Commissioner of Mines, in January last accepted the position of Engineer of the Snake River Mines, and put up Smelting Works, which have just commenced operations with great success. We learn that the smelting is working very satisfactorily, and the first ten tons of ore smelted yielded $3,379. Mr. EILERS has recently accepted an interest in the Germania Smelting and Refining Works at Salt Lake City, leaving his very able assistant Mr. FOHR in charge of the Boston Silver Company's Works of Snake River.

MINING NOTES.

CALIFORNIA.—*Main Feather River Gold Mining Company.*—This is a recent organization for the object of recovering the gold washed down to the rivers from the waste in hydraulic mining, and also from the accumulation deposited from the gulches and mountain streams. The plan adopted by the company—one which has been successfully tried on the Trinity River, and which is pronounced practicable on the Feather by eminent engineers and miners of long experience is this: To commence a shaft on the bank of the river at a point opposite the last and richest workings of the former claims and above high water mark, and sink the same below the bed rock underlying the original gravel bed of the river; to run an upward incline drift from the bottom of the shaft through the bed rock into the gravel bed, and then along on the surface of the bed rock where the most valuable deposits are always found. To prevent the complete success of this plan there is but one contingency, viz: Such an influx of water, seeping through the gravel, as cannot be controlled by a pump, filling the drift and shaft. But it is the belief that the pipe-clay debris which for many years has been flowing into the river bed from the various hydraulic mines, and which at present is of a depth varying from 15 to 24 feet, has so puddled the underlying gravel that the percolation of water will not be greater than can be kept down by a powerful pump. If this method proves successful it will lead to the profitable working of many an abandoned but still valuable subaqueous claim. In the old days several companies operated successfully on various claims situated in the bed of the Feather river, though from the method of working they pursued, they necessarily labored under a great disadvantage. This method involved the construction of a wing dam and flume, by which to turn the river; work which necessarily could only be commenced late in the Summer, when the river was low, and which, besides being very costly, required so much time for their completion and the removal of the debris overlying the pay gravel, that, except in unusually dry seasons, the fall rains would set in and the consequent rise in the rivers sweep everything away before a sufficient amount could be extracted to reimburse the original outlay and afford a profit. This great risk and the steadily increasing amount of sediment in the river bed necessarily led to the abandonment of the claims named, notwithstanding the vast wealth known to exist. That some idea may be formed of the almost fabulous richness of these deposits, it may be stated that the Cape Company paid $200,000 dividends in one season as the result of a little over a month of work in the gravel, and the Union Cape in three weeks extracted $360,000, besides $100,000 realized by a party of Chinamen to whom they sold a portion of their claim; the amount of ground worked in both instances being inconsiderable, and the bed rock, where the heaviest pay is found, being reached but rarely. Where it was reached the gravel paid nearly $2,000 to the pan; the average pay of the upper stratum being about $40 to the bucket.—San Francisco *Stock Report*, October 27.

Eureka (Grass Valley) Gold Mine.—The Superintendent gives the following as the result of the operations in this mine during the year ending with the 1st of October. We have driven 191 feet of drifts, and 40 feet of cross-cuts; have also sunk 99 feet of shaft, and driven 579 feet of cross-cuts on the Roannaise; and sunk 159 feet of shaft, and driven 335 feet of drift, and 58 feet of cross-cut in the Morehouse. We have hoisted 5,212 tons of quartz, and crushed 5,362 tons in 239 days with 20 stamps, 12 hours per day; and 68 days with 10 stamps, 12 hours per day, averaging a little under 2 tons per 24 hours for each stamp. We have concentrated 26¾ tons of sulphurets and worked the same amount, and have now on hand 4¼ tons, which I value at $400 net. There are about 150 tons of rock on the surface, and 50 tons broke in the mine ready for hoisting. The amount of quartz extracted during the past year from the various levels has been as follows, viz: From the second level, 76 tons; from the fourth level, 2,643 tons; from the fifth level, 2,214 tons; from the sixth level. 282 tons, making a total of 5,212 tons There is upward of 200 tons of ore in sight which will pay a small profit. I need not express my disappointment at not having succeeded in tracing or finding the Eureka ledge to the west or south. I have abandoned prospecting for it in the Morehouse and on the south. The only chance now I see of finding it is in cross-cutting north from No. 3 shaft on the Roannaise ground, and I advise the continuance of that cross-cut. It is now in 286 feet from the shaft, and is being run very cheaply, as we are using water power for pumping and hoisting. The mill machinery is very much run down and of course decreased in value. I would recommend that, after working the quartz still remaining in the mine, and completing the cross-cut now being made in the Roannaise, (should nothing of value be found) the company cease all further explorations and go into liquidation.

COLORADO.—*The German Tunnel Company* has a capital stock of $15,000, divided into 30 shares of $500 each. This tunnel is located on the south side of Gregory Street, opposite Turner Hall, in Central, and on a level with the public thoroughfare. Since the organization, 450 feet has been run. The lowest contract for excavation was $8 per foot, the highest $15, which is now paid. Five veins have been cut, only one of which, the "East Boston," is known to have been discovered on the surface. Lode No. 2 was crossed 140 feet from the tunnel entrance, and has been drifted east about 25 feet on ore that returned three ounces per cord under stamps. Water came in, and further work in that direction was abandoned for the time being. Lode No. 3 is probably the East Boston, but it shows very thin, and no drifting has been done. The streak is probably two inches wide, carrying native copper and iron pyrites. Lode No. 5 has been explored the distance of three or four feet east. The crevice is about two and a half feet wide, and the ore has yielded as high as three ounces per cord. A very small amount of work has been done on No. 4.

The Ogallalla Silver Mine, in Sugar Loaf District, is in a promising condition. A tunnel has been run 400 feet on the vein, at a depth from the surface of 200 feet. The crevice is five feet wide carrying a pay streak, or mineral vein, from eight to ten inches thick. This ore brings $216 per ton at BOYD'S works in Boulder. The owners of this mine are also sinking and drifting the vein below the tunnel.—*Central City Register*, Oct. 28th.

The Boulder Valley Coal Company, located at Erie, Colorado, ships from their mine about 160 tons of coal daily; the Rob Roy, just over the line, in Boulder County, 150 tons per day. The quality of the Rob Roy coal is superior to most of the coal mined in the State. Hoisting works, just opposite the Rob Roy Mine, on the same vein, on the B. V. R. R., are rapidly approaching completion, and the shaft fast nearing the coal, which is seven feet in thickness. When finished the new works will be equal, if not superior, to any in the State. The coal will be in the market within a few weeks.—*Boulders News*, Nov. 3.

ARIZONA.—*The French Silver Mine* is located 80 miles East of South from Tucson. It produces a first-class smelting ore, and was worked one hundred years or more since by the old Jesuit Fathers. The ore averages $80 per ton in silver, and selected goes well up into the hundreds. The workings are two tunnels, of 200 and 300 feet, and several shafts, the deepest being 120 feet. The vein matter is 7 feet wide, running east and west, and the lode has been traced and located over 20,000 feet; 50 men are employed, of whom about one-third are whites and the rest Mexicans. Two Mexican furnaces are in operation, and two new improved ones will be in operation soon with prospects of eminent success.

The Sea Serpent Silver Lode is 70 miles south-west from Tucson, another immense lode, traced and located for some 20,000 feet the vein running north-east and south-west. The Emma mine, on this vein, shows vein matter from 10 to 30 feet wide, and the ore assays from $50 to $800 per ton, and selected, as high as $5,000 per ton. This mine is 8 miles west of the old Cerro Colorado mine, and 15 miles north of the Sonora line.

The Yellow Jacket Gold and Silver Mine, on the Ostrich lode, is 75 miles west of South from Tucson, and gold-bearing. The owners of this mine, are working a ten-stamp mill, and employing 40 to 50 men. The vein matter is 12 feet wide with a pay streak of over 3 feet which works $20 per ton; depth shaft, 60 feet; length of tunnels, 20 and 30 feet. They have also a parallel vein 20 feet north, of equal size and richness to the main lode, and a tunnel in some 20 feet; capacity of mill, 15 tons per day; wood and labor both cheap, and a good supply of water.—*Tucson Miner.*

MONTANA.—*The La Plata Gold and Silver Mine* is located at Butte. The ore now coming out is from levels at bottom of shaft, eighty feet deep, and is of good grade. A recent run from one hundred tons averaged $125 in silver and $40 in gold. The first-class ore is being cribbed on the ground. If the owners can sell so as to realize what they think is right, they will dispose of the ore here, but if not will hold and ship it next season. The La Plata Company are employing thirteen men, all told, and are raising from seven to nine tons of ore per day. Considerable improvement, in the way of enlarging the works above ground, is contemplated and will be begun in a short time. A building of sufficient dimensions to allow of all work to be done under cover, and leave space for whatever ore may accumulate, is to be put up adjoining those already standing. It is the intention of the owners to continue work during the winter. A shaft is being sunk about 450 feet west of discovery on the La Plata, which is down now about 40 feet, showing the same quality of ore as that in the main shaft.—*Butte Miner*, October 24.

NEVADA ANTIMONY MINES.—These mines are located in the Southern part of Humboldt County, and are represented as containing the most extensive deposits of antimony ore ever discovered on the coast. The ore is high grade, carrying from 60 to 72 per cent. metal. It is proposed to ship the ore to San Francisco.

WYOMING COAL MINES.—*Renton Coal Mine.*—The vein in this mine which is reached at 200 feet from the entrance of the tunnel is seven feet thick. The miners were at work, some undermining the vein; others prying and wedging it down in great masses. The present gang take out 80 tons a day. After picking etc., the clean coal is loaded and hauled by a string of three horses, four miles, to a wharf, from which the coal passes to the scows, lighters, or barges, and is then towed to Seattle.

The Seattle Coal Company own 480 acres in one claim, and an undivided three-tenth interest in 160 acres adjoining; on the gangways opened they have, it is estimated, some 1,873,927 tons of coal; and above the level of the gangways, west of the Gattenburg claim, they have 374,783 tons more. From the mines this coal is hauled in mine cars (2,800 lb.) to the bunkers, dumped, screened, and loaded into the railways, two and a half tons each; from which it is taken to Lake Washington wharf, a distance of three and a quarter miles. It costs 62½ cents a ton to get it here. Here is a down grade of 900 feet; down this the loaded car passes, hauling up by its weight an empty car. The loaded car runs by gravity along the wharf and on to the deck of the barge.—From correspondence in San Francisco *Journal of Commerce.*

NOTES.

COAL MINERS' STRIKE IN NEVADA.—The miners employed in a coal mine at Pancake Mountain, have struck for $4.50 per day, declining to work longer for $4 per day—the rate at which they were being paid. The employer refused to accede to the terms of the men, and they quit work.

MINERS' WAGES IN GRASS VALLEY, CALIFORNIA.—The wages of miners, ditch men, and of others employed on mining properties at Dutch Flat, Little York, and You Bet, have been reduced. Miners' wages in some of the companies there are now put down to $2.50 a day, and it is thought that all the companies will join in the reduction. There is a good deal of excitement over the matter in the places named.

BOULDER, COLORADO, CONCENTRATION WORKS.—The following prices are paid for gold and silver ores, assaying from $30 to 60 per ton, delivered at the works in lots of not less than 2,000 lb.:

Assay per ton.	Price per ton.	Assay per ton.	Price per ton.	Assay per ton.	Price per ton.
$30	$10 00	$41	$15 50	$51	$20 50
31	10 50	42	16 00	52	21 00
32	11 00	43	16 50	53	21 50
33	11 50	44	17 50	54	22 00
34	12 00	45	17 50	55	22 50
35	12 50	46	18 00	56	23 00
36	13 00	47	18 50	57	23 50
37	13 50	48	19 00	58	24 00
38	14 00	49	19 50	59	24 50
39	14 50	50	20 00	60	25 00
40	16 00				

Special arrangements made for ores assaying less than price list, carrying iron, lead, and copper. Also for ores easily concentrated, assaying from $50 to $60. Parties wishing to reclaim the product, can do so by paying $10 per ton for crushing, concentrating, and sampling the ore.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Nov. 4.

Tons of 2,240 lb.	1876.		1875.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co.	62,326	1,643,578	56,447	2,590,265
D. L. and W. RR. Co.	71,372	1,520,736	56,967	2,580,932
Penn. Coal Co	34,139	893,865	29,302	1,165,499
L. V. RR. Co.	18,580	798,291	21,980	796,557
P. and N. Y. RR. Co.	972	19,668	534	82,932
C. RR. of N. J.	36,162	1,101,299	38,324	1,187,916
Penn. Canal	14,648	362,112	13,506	265,415
	238,199	6,339,549	217,060	8,669,516
Lehigh Region.				
L. V. RR. Co	92,152	2,280,299	82,838	2,741,858
C. RR. of N. J.	32,775	1,158,129	26,810	614,748
D. H. and W. B. RR.	708	36,701	2,594	69,904
	125,635	3,475,129	112,242	2,426,510
Schuylkill Region.				
P. and R. R. RR. Co.	155,062	4,000,686	102,030	3,902,759
Shamokin & Lykens Va.	4,970	782,773	25,248	1,051,584
	160,032	4,783,459	127,278	4,954,343
Sullivan Region.				
Sal. and Erie RR. Co.	253	28,698	286	8,137
Total	524,119	14,626,835	456,866	16,058,506
Increase	67,253	—	—	—
Decrease	—	1,431,671	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 453,602 tons, as compared with the corresponding period in 1875.

Belvidere Delaware RR. report.	Week.	Year 1876.	Year 1875.
Receipts of coal at Coal Port (Trenton)	11,339	249,916	158,587
" " " South Amboy	8,842	366,534	213,052
Shipments at Coal Port (Trenton)	11,691	244,963	154,417
" South Amboy	14,638	417,762	283,823

Perth Amboy business :	Tons.
Received for the week	23,128
Shipped for the week	27,694
On hand Nov. 4	33,601

Receipts of Coal at Boston, for the week ending Nov. 3, and years from Sept. 1, 1875 and 1876.

From	Week. Tons.	Previously. 1876. Tons.	1875. Tons.
Alexandria and Georgetown	600	9,997	29,761
Philadelphia	24,933	761,518	199,195
Baltimore	5,838	30,024	37,998
Other places	2,730	61,398	82,317
Great Britain	—	1,164	704
Nova Scotia	1,760	9,155	10,554

Coal Shipped at Pictou, N. S., for week ending Oct. 28 1876 ..... 4,619 tons.
Previously exported, since Jan. 1 ..... 151,375 "
Total to date 155,994

The Production of Bituminous Coal for the week ending Nov. 4, was as follows :

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week. Tons.	Year. Tons.
Tons of 2,240 lb.	45,168	1,538,410
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb.	8,461	28,965
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	3,598	131,986
*East Broad Top	1,406	55,574
Clearfield Region, Pa.		
*Snow Shoe	851	42,132
*Tyrone and Clearfield	22,970	938,022
Allegheny Region, Pa.		
*Pennsylvania RR.	3,192	167,655
Pittsburgh Region, Pa.		
*West Penn. RR	3,606	163,793
*Southwest Penn. RR	1,028	46,768
*Penn. & Westmoreland gas coal, Pa. RR.	21,658	683,291
*Pennsylvania RR.	8,075	248,320

* For the week ending Oct. 21.

The Production of Coke for the week ending Oct. 21.

Tons of 2000 lb.	Week.	Year.
West Penn. RR.	617	39,070
Southwest Penn. RR.	10,126	421,940
Penn. & Westmoreland Region, Penn. RR.	1,502	44,676
Pittsburgh, Penn. RR.	2,928	128,751
Total	15,223	634,437

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Nov. 10, 1876

Anthracite.

We have for weeks pointed to the middle of this month as the term of the moderately brisk coal market which has ruled since the reduction in price. For the past two weeks we have noted a perceptible decrease in demand, a feature which has now become quite marked, and is likely to become still more so before the end of the year. The only size of coal that is in quite active request is chestnut, and it is not so much sought after as it was a week ago.

The prices of coal that have ruled during the past two months have been pronounced unsatisfactory and unprofitable. It is quite probable that the average prices for 1877 will be little or no better, and the producers of coal should prepare to make the best of the situation. Were it not that the whole range of values in coal property is upon an exceedingly inflated basis, and that the large companies in their attempts to monopolize properties that cannot be exhausted for several hundred years, have burdened themselves with enormous interest accounts, coal could be produced at a fair profit at present prices, by simply placing wages upon a level with those in other and similar industries. There has been as yet no official annoucement that there will be a still further reduction of wages about the first of next year, but it is pretty generally understood that such will be the case, and that it will be a general, although, perhaps, not a united action on the part of the companies. To the miners, who have in times past been paid extraordinarily high wages, and starved by having work only one-half to one-quarter of the time, this may appear a heavy blow, but there is no reasonable argument in support of any material difference between coal miners' and iron miners' wages, while in other labor at the mines there should be no difference in value as compared with similar labor in other industries. Successful resistance on the part of the men, is simply out of the question. The companies must be successful in the end, and the miners' strikes would only bring upon the men unnecessary privations As the plans of the companies become more fully developed, we shall give this subject further attention.

We are quite well aware of the fact that with seeming high wages during the past year or two, the miners have really made but small earnings, and that little has been absorbed in the abnormally high cost of living in the coal regions. The trouble, as we have frequently pointed out, lay fundamentally in the high rates of wages which overstocked the field with labor, and the unwise policy of the Combination, which, by maintaining too high prices for coal, greatly reduced its consumption. The remedy has come in the manner that was seen to be inevitable. The men find that they will starve if they remain with half work and constantly declining wages, and they are leaving the coal fields. In this they are wise. They can count for certain that no big prices for coal or for labor will be obtained for a year or two at least, and there is every prospect of the present rate of production being curtailed before long, and with it many will be thrown out of employment. When a sufficient number have left the field, the remainder can do better on the low wages that are likely to rule for some time to come, than they have done on the nominally high rates of the past, and the production will increase as the cost and selling price diminish.

Although the demand has fallen off, the production continues to be well maintained, having been last week, nearly as much as the week previous, and about 70,000 tons more than during the corresponding week of 1875. The Lehigh Region shows an increase of production so far this year as compared with the corresponding period of 1875, of about 1,050,000 tons, while the Wyoming Region shows a falling off of over 2,325,000 tons, and the Schuylkill Region over 170,000 tons. The Delaware and Hudson Canal Company shows a decreased production of 946,687 tons or 36½ per cent.; the Delaware, Lackawanna and Western Railroad Company, 1,060,196 tons or 41 per cent.; the Pennsylvania Coal Company, 271,634 tons or 23 per cent. The Lehigh Valley Railroad Company shows an increased production on its line so far this year as compared with the corresponding time last year, of 476,911 tons or 18 per cent.; the New Jersey Central Railroad, 456,764 tons or 25 per cent.; and the Philadelphia and Reading Railroad, 97,927 tons or about 3 per cent.

Bituminous.

This interest affords as little worthy of note as it has for months. The business in Cumberland coal is a very quiet one, although the production last week was over 6,000 tons in excess of the corresponding week of 1875. The shipments from the Clearfield Region are very liberal, although there are complaints of a short supply of cars, caused by delay in transportation, the result of an excessive passenger traffic upon the Pennsylvania Railroad. Although the miners in this region are at work, yet the labor question appears to be in a very unsettled state.

Coal Trade of Philadelphia.

PHILADELPHIA, Nov. 9, 1876.

From our Special Correspondent.

ORDERS are becoming scarcer and scarcer every day —no doubt a good deal of the present stagnation is caused by the political excitement. On the whole, however, the market at all points seems fully supplied, and unless some improvement in the iron business, or very cold weather are close at hand to give some activity to the trade, it is practically over for this season—and contraction will soon be the order of the day.

The advance in prices attempted on the first of this month has not been maintained, and the rates are now the same as they were last month.

Vessels have been very plenty at this port for the last few days, and freights have a downward tendency. The rates to the East have not declined, except for large vessels, Captains preferring to go South or this side of the Cape. As a consequence southern freights are lower and down to 80 cents to Washington and Norfolk. Some large vessels have been taken to Boston at $1.90 to $1 85.

Wholesale Prices of Anthracite Coal for Nov., f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Rondout	3 15	3 20	3 30	3 40	4 25	4 00
Pittston at Newburg	3 00	3 05	3 15	3 25	4 10	3 70
Wilkesbarre at Port Johnston	3 25	3 25	3 50	3 50	4 25	3 60
Plymouth, R. A.	....	....	3 50	3 50	4 30	3 60
Susque. Coal Co. at Amboy W.A.	3 25	3 25	3 50	3 50	4 15	3 60
Kingston at Hoboken	3 25	3 25	3 25	3 40	4 10	3 75
Lehigh Coals.						
Old Company at Port Johnston	4 00	....	3 60	3 60	4 00	3 60
Old Company's Room Run "	4 00	....	3 60	3 60	4 00	3 60
Sugar Loaf, Hobok. & Amb. "	4 00	....	3 60	3 60	4 00	3 60
Lehigh Coal Exchange "	4 00	....	3 60	3 60	4 00	3 60
Honey Brook Lehigh	4 00	....	3 60	3 60	4 00	3 60
Beaver Meadow at South Amboy	4 00	....	3 60	3 60	4 00	3 60
Schuylkill Coals at Philadelphia.						
Schuylkill white ash	3 20	3 20	3 20	3 20	3 70	3 45
Schuylkill red ash	....	....	....	3 30	3 80	3 20
Lorberry	....	....	4 20	4 20	4 20	3 25
Lykens Valley	....	....	4 70	4 70	4 70	3 70
North Franklin red ash	....	....	4 20	4 20	4 20	3 25

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

	Per ton.
Freight from Hoboken and Weehawken to New York	45c.
" " Elizabethport & Port Johnston to N. York.	45c.
" " South Amboy to New York	45c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, Rondout, South Amboy and Perth Amboy to New York City and vicinity 50c.

Freight by the Pennsylvania Coal Company's boats from Newburg to New York 60c.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 00
Youghiogheny, Waverly Co., at Balt.	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	5 50	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va	3 50@3 75	4 90
Cumberland, at Baltimore	3 65@3 80	5 10
Clearfield f.o.b. Canton, Baltimore	3 40@3 65	5 25

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 90c. f.o.b, at Greenwich, Phila., for Eastern and Foreign shipments, per 2,240 lb. $3 25@340 for Sound ports, 3 50@3 65, through Delaware and Raritan Canal, for points on Hudson River, $3 80 f.o.b., at South Amboy, N.J., per 2,240 lb., $4 50@4 70. Discharged, in New York, per 2,240 lb., $5 00@5 25.

Foreign Gas Coals.

	Sterling.	Am. cur'cy.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	24/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$4 20	$4 50	$3 80
Lackawanna coal, in yard	4 20	4 50	3 80
Wilkes-Barre, delivered	5 00	5 30	4 60
Lehigh & Locust Mountain, del'd	5 50	5 50	5 00
Schuylkill Red Ash, del'd	6 00	6 00	5 50

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb	$18 00
Liverpool House Cannel " " "	.... 22 00
American " " "	.... 13 00
Cannelton Block, or splint, " "	.... 10 00
American Orrel " " "	....11@14
Red Bank Cannel " " "	.... 10 00
Cumberland " " "	.... 7 00

Baltimore, Md. Nov. 6, 1876.

Reported by our Special Correspondent.

ANTHRACITE.

Wholesale or Trade Prices per 2240 lb.

Wilkes-Barre "Lee" or "Diamond," Pittston and Plymouth. White ash.	In cars at depot.	By boats afloat.
Lump and steamboat	$3 85	$3 55
Broken	3 85	3 55
Egg	3 85	3 55
Stove	4 35	4 05
Nut	3 85	3 55
Shamokin, (red or white ash), and "Boston," free burning white ash,		
Egg	4 10	3 80
Stove	4 35	4 05
Lykens Valley, red ash,		
Egg and stove	5 35	5 05

From wharf or yard, wholesale, 50@75c. additional.
By retail, all kinds and sizes, per 2240 lb. ..... $5 00@7 50

BITUMINOUS.

George's Creek, Cumberland f. o. b. at Locust Point	3 75@4 00
West Virginia Gas f. o. b. at Locust Point	4 50
Youghiogheny Gas, f. o. b. at Locust Point	4 50
Swanton	4 00

Boston. Nov. 4, 1876.

COAL is moving very sharply into retailing consumers' hands, while the demand from the pockets for manufacturing purposes is larger. The demand for freights has urged a better feeling to cargoes, and nothing can now be had on the spot under the auction rates, freight added. The market here has been little affected by the mining suspension reports, as such cessation of work for one or two weeks usually comes up at election times. Freights are strong and scarce. We quote our last week's figures as the lowest rates on charters from New York, $1.60; Philadelphia, $2@2.10; Baltimore, $2 and Georgetown, $2@2 25.—*Commercial Bulletin.*

Buffalo, N. Y. Nov. 8, 1876.

Reported by LEE & LOOMIS.

Deliv'red at	Elmira. Afloat.	Ithaca. Afloat.	Syracuse Afloat.	Rochester. Afloat.	Rochester. ret. del.	Oswego f.o.b.
Grate	$4 20	$3 45	$3 60	$4 30	$5 55	$4 55
Egg	4 20	3 55	3 70	4 40	5 65	4 65
Stove	4 60	4 05	4 20	4 90	6 15	5 15
Nut	4 35	3 80	3 95	4 65	5 90	4 90

Delivered at	Erie. f.o.b.	Buffalo. Afloat.	Buffalo. f.o.b.	Buffalo. ret. del.
Grate	$5 05	$4 55	$5 05	$5 80
Egg	5 15	4 65	5 15	5 90
Stove	5 65	5 15	5 65	6 40
Nut	5 40	4 90	5 40	6 15

Chicago, Ill. Nov. 8, 1876.

Lackawanna Stove	$8 00
" Chestnut	8 00
" Grate and Egg	7 50
Erie and Brier Hill	6 00
Wilmington and Illinois	3 50@ 4 25
Blossburgh	7 00

Cincinnati, O. Nov. 6, 1876.

Reported by our Special Correspondent.

Per ton of 2000 lb.	Bush.	Ton.
Youghiogheny, or Pittsburgh, afloat	@3c.	—
Pomeroy coal	@5c.	—
Kanawha "	7½c.	—
Ohio River Coal	5½c.	—
Cannel coal, according to quality	@16c.	—

The following are the retail prices delivered

Youghiogheny	10c@11c.	—
Pomeroy	9c.	—
Cannel	@22c.	—
Kanawha	10c.	—
Anthracite, per ton		$9 00
Coke, at yard	10c.	—
Coke, hard and soft, delivered	— @9c.	—

Cleveland, O. Nov. 6, 1876.

Specially reported by Messrs. LAMBIE & BATES.

There is an active demand for all grades of shipping coals, particularly Briar Hill and Straitsville lower vein. The latter has advanced 10c. per ton, owing to the strike at the mines, and an advance of 10c. in digging. Vessels scarce and steady advance in freights to all points.

Retail price of hard coal advanced as follows. Soft coal unchanged.

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons.	10 tons upw'd
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Indianapolis, Ind. Nov. 6, 1876.

Specially reported by Messrs. COBB & BRANHAM.

Wholesale on board cars, and retail delivered to consumers.

Per ton of 2000 lb., bushel of 70 lb.

BITUMINOUS.

White River, per ton	$2 50	Peytona cannel, per ton.	5 75
Brazil Block, "	2 50	Indiana Cannel	4 50
Highland, grate, "	2 25	Hocking Valley	4 25
Block coal, nut, per car	18 00	Youghiogheny	4 50
Highland " "	18 00	Blossburg (smithing)	6 50
Block Slack "	17 00	Piedmont "	6 50
		Gas coke, per bushel	10

ANTHRACITE (Lackawanna and Wilkes-Barre.)

Broken	$8 35	Nut	8 50
Egg	8 35	Stove	8 75

Lehigh Anthracite.

Broken	9 75	Nut	9 50
Egg	9 75	Stove	10 00

Retail, per bushel, delivered.

Sand Creek	15c.	Block Nut, steam	8
White River	13	" Slack, "	7
Brazil Block	14	Peytona Cannel	28
Highland grate	13	Virginia "	27
Block Nut, domestic use	12	Youghiogheny	20
Highland Nut, "	12	Blossburg	26
" " steam	8	Piedmont	26

GAS COKE (measured.)

Crushed	15c.	Lump	12c.

ANTHRACITE.

Wilkes-Barre and Lackawanna (all sizes)	$9 75 per ton.
Lehigh, retail	$11 50 per ton.

Louisville, Ky. Nov. 6, 1876.

Specially reported by Messrs. BYRNE & SPEED.

Please report our prices as follows:

WHOLESALE.

	per bushel		per bushel
Pittsburg	6½c.	Pine Hill	—
Raymond City	6½c.	Kentucky	7c

RETAIL.

	per bushel		per bushel
Pittsburgh	10c.	Peytona Cannel	18c.
Raymond City	10c.	Buckeye "	
Pine Hill	13c.	City-made Coke	8c.
Kentucky	9c.	Anth., per ton, $10 00 to 10 50	
Screened Pittsburgh per load			$3 50
Screened Raymond City			2 50
Pine Hill (Kentucky)			2 25
Cannel			4 50
City-made Coke			4 00

Milwaukee, Wis. Nov. 6, 1876.

Specially reported by Messrs. R. P. ELMORE & Co.

Trade is quiet. Our prices for coal are:

Retail price per ton of 2000 lb.

Lehigh Lump	$ 9 00	Briar Hill, select	$7 00
Lehigh Prepared	9 50	Blossburgh	7 00
Lackawanna (all sizes)	8 50	Cannel	8 00
Pittston	8 50	Pittsburgh	6 50
Scranton	8 50	Steam coal	5 50

New Orleans, La. Nov. 1, 1876.

Reported by C. A. MILTENBERGER & Co.

The quantity of coal on hand at Willow Grove coal landing, Nov. 1, was 151 boats, 12 barges, and 3 French creeks. The consumption during October was 23 boats, 12 barges, and 3 French creeks. The arrivals were 5 boats and 15 barges.

We have no change to report in the local market since our last, except that of a firmer feeling and better demand. We quote:

Pittsburg coal, wholesale, by boat-load, per bbl	27@28c.
" steamboats, per bbl	40c.
" to manufacturers	42½@45c.
" to families	45@50c.
" shipments, per hhd	$5 00
Anthracite, wholesale, per ton	8@8.50c
" retail, "	12@13
Virginia Cannel, per bbl	80c.
Scotch " "	c.
Mt. Carbon, wholesale, per bbl	
" " retail, "	50c.
St. Bernard wholesale, per bbl	25c.
" steamboat	3c.
" retail, "	4@45c.

Pittston, Pa. Nov. 9, 1876.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Richmond, Va. Nov. 6, 1876.

Specially reported by S. H. HAWES, Dealer in Coal.

Prices are now as follows:

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 00
" semi-Cannel	4 00	Clover Hill Coal	3 50
Coalburgh Splint	4 00	James River Bitum	3 30
Lewiston "	4 00	" " Carbonite,	5 00
Kanawha Gas coal	3 90		

St. Louis. Nov. 6, 1876.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered.

ANTHRACITE.

	per ton.
Lackawanna	$9 00@10 00
Wilkes-Barre	9 00@10 00
Schuylkill	9 00@10 00
Lehigh	11 00@12 00

BITUMINOUS.

Blossburg	9 00
Pittsburg	4 50
Indiana Block	4 00
Big Meadow	3 00
Illinois Coals	2 50@3 00
Connellsville Coke	9 00

Toledo, Ohio. Nov. 6, 1876.

Specially reported by GOSLINE & BARBOUR.

We quote as follows for retail delivery:

Lackawanna lump	$6 75	Lehigh lump	$7 75
" egg	6 75	" egg	7 75
" stove	7 00	" stove	8 00
" chestnut	6 75	" chestnut	7 75

Soft Coal.

Hocking lump	4 00	Brier Hill	5 75
" nut	4 00	Blossburg	8 00
Willow Bank lump	4 50	Cumberland	8 00
" " nut	4 00		

Montreal. Nov. 6, 1876.

Specially reported by Messrs. ROBERT C. ADAMS & Co.

Wholesale per ton of 2240 lb.

Scotch Steam	$4 25	Cape Breton Steam	$3 75
Pictou "	4 25	Newcastle Smiths,	5 50

Anthracite at retail, per 2000 lb., delivered.

Egg	$6 25	Chestnut	6 25
Stove	6 75		

Hamilton, Ont. Nov. 6, 1876.

Specially reported by H. BARNARD, Dealer in Coal.

Grate	$5 75
Egg	5 75
Stove	6 00
Nut	5 75
Lehigh Lump	6 50
Smithing	6 00
Bituminous, retail	5 50
" steam	4 00
Coke	6 75

Freights

Representing the latest actual charters up to Nov. 9, 1876.

Per Ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore.	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me	....	....	....	....
Albany	....	....	....	....
Alexandria	....	....	....	....
Amesbury, Mass	....	....	....	1 75
Bangor, Me	....	3 00	....	1 50
Bath, Me	....	2 25	2 30	1 50
Baltimore	....	....	....	....
Boston, Mass	1 80@2 00	2 25	225–30	1 50
Bridgeport, Ct	1 15†	2 00	1 90	80
Bristol, R. I.	1 60	....	....	1 00
Cambridgeport, Mass.	2 00@2 10	....	....	1 50
Derby	....	....	....	....
Dighton	....	....	....	....
East Cambridge	2 00@2 10	....	....	1 50
Fall River	1 60	2 00	2 00	1 00
Hackensack	1 12†	....	....	....
Hallowell, Me	....	....	....	....
Hartford	1 75@2 00	2 50	....	1 35
Hoboken	†95	....	1 55	45
Hudson	1 10	1 90	....	....
Jersey City	†95	....	1 55	45
Lynn, Mass	....	....	....	†1 50
Middletown	1 75@2 00	....	....	1 15
Mystic	....	....	....	....
Newark	†96	1 60	....	....
New Bedford	1 75	2 00	2 00	1 10
Newburyport	2 00	2 40	2 30	1 70
New Haven	1 10†	2 00	1 90	80
New London	1 60	2 00	2 00	80
Newport	1 60	....	....	1 10
New York	†95	1 65	1 65	45
Norfolk	....	60	70	75
Norwalk	1 10†	1 90	....	80
Norwich	1 60	1 90	....	1 00
Pawtucket	1 75	2 00	....	†1 10
Philadelphia	....	1 00	....	....
Portland	2 00@2 15	2 00	2 30	1 35
Portsmouth, N. H.	2 00@2 10	2 40	2 40	1 70
Providence	1 60	2 00	2 00	1 00
Poughkeepsie, N. Y.	1 10†	....	....	....
Rockport	....	....	....	....
Saco	....	....	....	....
Sag Harbor	....	....	....	....
Salem, Mass	2 10@2 15	2 25	....	1 50
Salisbury Pt., Mass	....	....	....	....
Stamford	1 10†	....	....	....
Stonington	....	....	....	....
Taunton	....	....	....	....
Troy	1 15†	....	....	....
Warren, R. I.	....	....	....	1 10
Wareham	....	....	2 20	....
Washington	....	....	....	....
Weymouth	....	....	....	....
Wilmington, Del	....	....	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c. per bridge extra.

Rates of Transportation on Anthracite Coal to Tide Ports.

Lehigh and Wyoming Coals.

per ton of 2240 lb.

	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 95	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	16	....	58	49	72
‡ Philipsburg, N. J., (46 miles)	58	....	1 00	91	1 14
Elizabethp't, (114 m.) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 20	1 1	1 68	1 55	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption, Jersey City, N. J., (121 miles) and New York, via L. V. RR.	1 89	1 75	2 31	2 22	2 45
	1 59	1 47	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $1 47

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 25

From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware Lackawanna and Western RR., Morris and Essex Division 65

From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR. 1 01

** Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 10c. less than the above rate.

The distances in the above table are Computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 101 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November, will be as follows:

To East Waverly, N. Y.	$1 75
" Ithaca, and for C. Lake RR. (local)	1 64
" " for C. Lake RR., and via Erie Canal (shipment)	1 56
" To Van Etten, for U. I. and E. RR.	1 61
"Geneva (local) for S. P. and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga	2 06
To Geneva, for Buffalo and Towanda	1 85
" " " Rochester and Charlotte	1 99
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	3 67
" " " Rochester	2 75

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Nov. 10, 1876.

American Pig.—During the past two weeks the Thomas Iron Company has sold about 4,000 tons of iron, mostly forge and No. 2 foundry, at $20 for these two grades, and $22 for No. 1 foundry. This company claims to be sold ahead until February. It would seem, however, that it has absorbed a large portion of trade that could have done on better terms elsewhere. No. 1 foundry iron continues to be offered at $21, and it is intimated that considerably lower prices have been accepted; while No. 2 foundry has been sold as low as $19. Some of the leading Lehigh companies claim to be holding firmly to the basis of $22 for No. 1 foundry. From a careful observation of the signs of the times, we regret to say that the outlook, for the early future, is a very gloomy one. The demand has decreased from what ruled a few weeks ago, and is now about as slack as at any time this year, while the production has increased considerably, and there is still talk of putting in blast some additional furnaces. This must result in an accumulation of stocks during the Winter, and as the companies that are able to carry iron are very few, it will be seeking a market at the best prices obtainable. It is the apparent inability of some companies to carry stock that principally causes the present weakness, and may result in prices, before Spring, lower than any we have yet had.

Scotch Pig.—This article is very quiet and not so firm as a week ago. We quote Glengarnock at $27@$27.50; Coltness, $28@$28.50; and Eglinton, $26@$26.50.

Rails.—We learn of no further business in these. Prices appear to be unchanged. We quote iron rails at mills at $36@$40, and steel at $50@$54. Considerable has been said of late relative to forming a combination among the makers of Bessemer steel in this country. So far, we are informed, there has been no plan fixed upon, nor do we believe that there will be. The managers of the various works had better take a lesson from the numerous failures at combination where it appeared fully as desirable and practicable as in this case. The managers will, eventually, be thrown upon their own resources. There is too much moral "cold-shortness" among steel, as among coal men, to make a combination having a sufficiently high limit of elasticity to withstand the shocks and strains brought upon it. If the matter takes a more definite shape we shall express our views on the subject, but we may say in advance that we think it would be injurious to the general interests of the country and of the iron trade.

Old Rails.—We note a sale of 300 tons on private terms, and quote at $20.50@$21.

Scrap.—This article continues to be very quiet at $27@$28.

Philadelphia Iron Trade.

Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, JR., & CO., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Nov. 9, 1876.

THE market has been dull during the past week. The election and the closing of the Exhibition have about monopolized the thoughts of the people. Most of the foundries and mills were closed on election day, and little or no business has been done this week. Prices are about the same as at our last. We hear of one furnace, on the Susquehanna, going into blast this week. We report sales of 1,000 tons Crane at quotations; 100 tons No. 1 Chickies at $22.50, and about 500 tons in scattering lots. We quote No. 1, $22 to $22.50; No. 2, $20 to $20.50; Gray Forge, $19 to $19.50; favored brands, $21.

MANUFACTURED IRON.—The demand for bars is, as it has been for weeks, dull and unprofitable, beyond anything even known in the history of the iron business. Prices are unchanged, and best brands are held at former rates. We quote 2.25-100c. to 2.3-10c. per lb.

PLATES.—Tank and skelp continues in demand, but are not so brisk as at our last. Prices are unchanged.

RAILS.—Nothing new this week. The dullness reported for some weeks continues. We quote iron $36 to $40 at mill; steel $52 to $54 at mill.

OLD RAILS are dull of sale at $22 to $22.50. We report sales of 100 tons at $22.

SCRAP is quoted: Wrought, $24 to $27; cast $14 to $19.

Baltimore. Nov. 8, 1876.

Specially reported by Messrs. R. C. HOFFMAN & Co.

The iron market remains unchanged, and we continue last quotations, as follows:

Baltimore Charcoal	$30@34	Anthracite No. 3	$20@21 00
Virginia Charcoal	28@33	Mottled and White	17@19 00
Anthracite No. 1	23@24	Charcoal C. B. Blooms	60@65 00
" No. 2	21@22	Refined Blooms	50@55 00

Boston. Nov. 4, 1876.

PIG has had a very quiet week, with holders quoting all sorts of prices at a range of $21 to $26 irregularly upon certain special brands. This occurs through the influence which seem to effect the minds of holders. Those who are confident of a near-by better season are high-priced; those contrary minded are low-priced. The supply of Scotch is small, quoting Gartsherrie $31 and Eglinton $29 currency.

BAR.—The jobbing demand has held along in a very moderate way at rather steady prices from $49 upward on refined and $40 on common.

STEEL continues moving freely for machinery purposes, with orders frequent for saw and small edge-tool steel. We notice that Messrs. LEEDS, ROBINSON & Co., 75 North Street, have decided to close out their tool, machinery and tire steel, to make room for their new lines of tacks and small nails. They will continue to carry and sell their celebrated sheet steel and saw plates.

We quote American tool 14@15c; American machinery 8@9½c; Bessemer tires 5¾c; Sweet's Excelsior Tire 7½c; English tool 15¼c gold.—*Commercial Bulletin.*

Cincinnati. Nov. 6, 1876.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Our market has been very quiet for the past week, but prices are firm at quotations.

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	4 mos
" No 2, "	22 50@23 00	4 mos
" Mill	21 00@22 00	4 mos
Tennessee, No. 1, Foundry	23 00@24 00	4 mos
Tennessee, No. 2, "	22 00@23 00	4 mos
" Mill	21 00@	4 mos
Missouri, No. 1, Foundry	@	4 mos

STONE COAL.

Ohio, No. 1, Foundry	22 50@	4 mos
" No. 2, "	21 00@	4 mos
Ohio Mill	20 00@	4 mos
Missouri, No. 1 Foundry	25 00@	4 mos
" No. 2, "	24 00@	4 mos
" Mill	23 00@	4 mos

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	4 mos
Tennessee "	25 00@32 00	4 mos
Missouri "	30 00@33 00	4 mos
Alabama "	25 00@32 00	4 mos

BLOOMS.

Charcoal	60 00@ 75 00	cash

SCRAP IRON.

Cast	50c.@ 85	cash
Wrought	1 00@1 40	cash

Cleveland, Ohio. Nov. 6, 1876.

Messrs. C. E. BINGHAM & Co., quote as follows:

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	27 00@
No. 2, " " "	26 00@
No. 1, Anthracite	24 50@
No 2, "	22 50@
No. 1, Bituminous	24 00@
No. 2, "	22 50@
American Scotch, No. 1, Cherry Valley	@
" " B—1, " "	@
" " No. 2, " "	@
No. 1, Massillon	25 00@
B—1, "	24 00@
No. 2, "	21 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	27 00@
No. 4 " " "	27 50@
Nos. 5 and 6 "	27 00@

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	27 00@

FORGE IRON.

No. 1, Gray	22 00@
White and Mottled	20 50@

Louisville. Nov. 7, 1876.

Specially reported by Messrs. GEORGE H. HULL & Co.

Our market remains firm since last report, with a good demand for mill and choice foundry grades, in hot blast, while the inquiry for car wheel irons show a steadily increasing demand for fair to choice brands, at full figures.

Pittsburg, Pa. Nov. 7, 1876.

Specially reported by A. H. CHILDS.

The market has been extremely dull during the past week, and sales very light. Quotations remain unchanged, but the tone of the market is weaker. It is hoped, however, that some of the activity which now finds its outlet in matters political, may, after to-day, become visible in the business interests of the country.

Richmond, Va. Nov. 6, 1876.

Reported by ASA SNYDER, Esq.

There is less activity in charcoal irons, although a sale of one hundred tons, since last report, has been made at full quotations.

St. Louis. Nov. 6, 1876.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

There are no changes to note in our market. The demand is good, and prices very firm at our quotations.

Mo. Stone Coal No. 1 Fy.	$25@26	Massillon Iron, A No	1.29@30
" " " 2 "	23@24	" " B "	1.31@—
" " Gray Mill,	22½@23	" " "	2.28@—
" Charcoal No. 1, Fy.	23@24	Cold Bl. Car Wheel, Mo.	30@33
" " " 2, "	22@23	" " " Tenn.	30@33
" " Gray Mill,	22@23	" " " Ala.	30@33
Tenn. " No. 1, Fdy	23@24	" " " H. R.	33@35
" " " 2, "	22@23	Mo. Charcoal Blooms	50@65
" " Gray Mill	22@23	" Scrap "	45@55
Va. Coke, No. 1, Fdy.	24@25	" " hammered	
" " " 2, "	23@24	Billets	75@80
" " Gray Mill,	21@23	Assorted Bar Iron	2 50, 60 days
H. R. Char. No. 1, Fdy.	25@26	No. 1 Wrought Scrap	90c. cwt.
" " " 2, "	24@25	Heavy cast "	70 "
" " Gray Mill,	24@25	Light "	50 "

THE SALT LAKE CITY SILVER ORE MARKET.

MR. J. B. MEADER, under date of the 4th inst., reports the following as the prices paid for silver and copper ores:

Argentiferous Lead (Base Bullion).—$70 per ton for lead; $1.17 per oz. for silver; $20 per oz. for gold. The above quotation for silver is based upon a silver contents in the lead of 80 to 120 oz. per ton of 2,000 lb.

Argentiferous Lead Ores.—From 90 cents to $1 per oz. for the silver contained therein, based upon a standard of 40 per cent. lead, each unit above 40 per cent. 50 cents per unit added. Each unit below 40 per cent. 50 cents deducted. Extreme prices, and only for most desirable carbonate ores, free from zinc, copper, and antimony. Ores containing zinc—For each unit of zinc above 5 per cent., deduct the value of 1 oz. of silver. Ores with a lime or ferruginous gangue, subject to higher rates. Copper, antimony, zinc, and iron pyrites in all the above ores objectionable.

Per ton of 2,000 lb.

Copper.—Ores assaying per cent.

* Net assay.	Per unit or per cent.
20	$1 25
25	1 50
30	1 70
35	1 85
40	2 00
45	2 13
50	2 25

* To obtain the net assay, 1 and 3-10 per cent. is deducted from the wet assay.

BASE BULLION SHIPMENTS.

Shipments of Base Bullion for month of October	3,782,635 lbs.	
Shipments of Base Bullion for 9 months	28,966,679 lbs.	
Total for 10 months	32,749,314 lbs.	
Ore shipments for October reduced to lead	1,060,152	
Ore shipments for 9 months reduced to lead	3,659,294	4,719,446 lbs.
Total production of lead for 10 months		37,468,760 lbs.

METALS.

NEW YORK, FRIDAY EVENING, Nov. 10, 1876.

THE past week has been exceedingly quiet, caused partially by the attention of business men having been largely taken up with political matters, but more particularly by consumers having very limited wants.

Gold Coin.—During the week under review, gold has ranged from 109⅛ to 110 and closed at 109¾.

Bullion.—The market for silver shows quite an advance as compared with last week, although it is not so high as yesterday, when the price in London was 54¼d., as against 54d., to-day, at which price it is firm. The quotations here range from 117@117½ per oz., while San Francisco quotes at 11⅛ per cent. discount.

Copper.—This article has been very quiet. We are reported sales of 150,000 lb. at 20c. which is the closing price. There are no important features to the market. The weakness is the result of small wants among consumers, while among the companies there is but very little offering at the above quotation.

Tin with a lack of business is quoted as follows: Straits, 17¼c.@17¾c.; refined, 17½c.@17½c.; L. & F., 17c.@17¼c.; and Banca, 19½c.@20c. Advices from London to-day quote Straits at £78, and L. & F. at £81 10/, with an upward tendency.

Tin Plates.—There is but very little doing in these. It is reported that sales in England have been made at an advance, and that the market there is firmer. The following are the quotations, in gold, per box: Charcoal tins, $6.75@$7, and ternes, $6.25@$6.50; coke tins, $6@$6.12, and ternes, $5.50@$5.75.

Lead.—The business of the week has only been in small lots at 6·05c.@6·125c. for ordinary domestic lead. Soft Missouri has advanced to 6·15c., owing to an advance in freights.

Spelter and Zinc.—Domestic spelter is very quiet at 6⅝c.@6¾c. Sheet zinc, with lack of business, is quoted at 8¼c., currency.

Quicksilver.—This article has advanced to 57c. per lb. in this market, and to 52c@55c, in San Francisco London continues to quote at £8.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Nov. 10, 1876.

THE excitement of the Presidential Election has been the all-engrossing feature during the past week, to the almost utter exclusion of dealings in the coal stocks. The total transactions scarcely reach 30,000 shares, against 158,000 shares as sold last week; quotations in all instances are lower.

Delaware, Lackawanna, and Western Railroad.—The quotations in this stock have ranged between 75 and 71⅞, closing at the lower figure. The sales aggregate over 20,000 shares.

New Jersey Central Railroad stock has ranged between 32⅝ and 37⅛, closing at the former figure. The sales aggregate 7,563 shares.

Reports that President E. W. CLARK, of the Lehigh Coal and Navigation Company, is to succeed Mr. KNIGHT as President of this company are denied. With regard to the adjustment of the difficulties with the Lehigh Coal and Navigation Company, the Lehigh Navigation Company agrees, it is said, to accept a part of the rental due on the Lehigh and Susquehanna road and the canals in money and the balance in notes given by the Central. This will afford the Central relief by postponing its most pressing liability for a time. Mr. JAMES MOORE, the new Superintendent of the road, assumed charge November 1. It is said that he will make many changes in subordinate officers, and that he will cut down the working force considerably. So far, however, but few changes have been made.

Delaware and Hudson Canal Company.—1,184 shares of this stock have changed hands between 70 and 74 per cent., the former price representing the closing quotation.

Bonds.—$120,000 in these have sold without any marked change in prices.

Parker and Karns City Railroad—The work of laying track on the extension from Karns City, Pa., to Butler is completed, and the first train ran through October 27. The extension is 17 miles long, making the whole length of the road 27 miles from Parker Pa., to Butler. The road, which is 3 feet guage, connects the Allegheny Valley at Parker, and serves chiefly to transport oil from the Butler district. The extension is built nominally by a separate company, the Karns City and Butler, but is really owned by the Parker and Karns City Company.

Musconetcong Iron Company.—A special meeting of the stockholders of this company will be held at the office of the company at Stanhope, Sussex County, New Jersey, upon Thursday, Nov. 16, to act upon propositions to increase the capital stock of the company, and to issue bonds secured by mortgage.

Thomas Iron Company.—It is said that this company has declared a dividend of 3 per cent.

Quotations and Sales of Stocks and Bonds.

For the week ending Nov. 10, 1876.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	220	—
Consolidation Coal Co	—	—	32	—
Spring Mt. Coal Co	—	—	†60	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	10	—
Del., Lack., and West. RR. Co	75	71⅞	71⅞	20,360
New Jersey Central RR. Co	37⅛	32⅝	37⅛	7,563
Delaware and Hudson Canal Co	74	70	70	1,184
Quicksilver Mining Co. pref'd	—	—	16	—
" " " Common	13	12½	11	220
Mariposa Land & Min. Co. pref'd	—	—	4¾	—
St. Louis & Iron Mountain RR	12¾	12¾	12	130

Total Shares sold 29,457
Sales for the week previous 157,947
Decrease 128,490

* Nominal. † Asked,

BONDS.

		Inter'st	Sales.	Price.
Del., Lack. & West.	2d M	M. & S.	....	.... @109½
" " "	7's Con'ble	J. & D.	....	.... @105
Cent'l RR. of N.J.,	1st M., New	F. & A.	2,000	.... @110¼
" " "	1st Cons	.....	59,000	87 @ 87¾
" " "	Convert'le	M. & N.	6,000	.... @ 84½
Lehigh & W.-B'e,	Con. Guar'd.	.....	8,000	.... @ 68
Am. Dock & Imp. Mt.	Bonds	J. & J.	....	.... @ 77
Del. & Hud. Can.,	1st M., 1891	.....	....	.... @108
" " "	1884	.. ....	....	.... @105
" " "	1877	.....	6,000	.... @101½
" " "	Coup. 7's, 1894	.....	17,000	99 @ 99½
" " "	Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain,	1st M	F. & A.	17,000	100 @100¼
" " "	2d M	M. & N	.....	.... @ 70
Chesapeake & Ohio	6's, 1st M..	.....	5,000	31½@ 32
" " "	Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan	con. 7s	.....	.....	.... @100⅝
Total sales			$120,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Nov. 9, 1876.

THE transactions in this market during the week just closed show an increase of over 5,000 shares compared with the business reported in our last, the total sales reaching nearly 97,000 shares. The market closes unsettled with the majority of the quotations lower.

Pennsylvania Railroad.—This stock has exhibited a marked steadiness through the business of the week; the closing quotation of 46¼ is a slight decline from the final price in our last. The sales reach 55,367 shares. The passenger business of this road during the past few months has had no parallel in the railroad history of the United States.

Reading Railroad.—This stock is lower, having sold down to 21⅝, and closes ¼ above the lowest figure attained; the sales aggregate nearly 34,000 shares. It is stated that this company is having great difficulty in providing for its floating debt.

The N. Y. *Daily Bulletin* says:—"Much interest is felt as to the extent to which the Reading Company has committed itself by guaranteeing the securities of other companies. In addition to its indorsement of the $30,000,000 of the Reading Coal and Iron Company's bonds, it has guaranteed bonds of the Phenix Iron Company, the Monocacy Furnace Company, AUGUST SCHWARZE, and the Reading Iron Works of SEYFERT, MCMANUS & Co., but what these guarantees aggregate, and what other commitments of the same character have been made, are matters on which there is no definite information. It is feared that, considering the present condition of the iron trade, they may prove to be a serious charge on the company. It is understood that the MACCALMONTS of London have formally presented a demand on the company for the return of the money and the fifty thousand shares of stock advanced last Spring, and that they deny all pretences that the loan was made otherwise than directly to the Reading Company and exclusively for the purposes and uses of that corporation."

The *Springfield Republican* says:—"The pig iron of this company, at various points, is now fenced in with barriers having the superscription of the Pennsylvania Warehouse Company, having been hypothecated, and the floating indebtedness of various kinds, it is now thought, amounts to six millions. Notice has been sent to dealers who furnish the Reading Railroad with its supplies that after the first of November all its purchases would be made on four months' time, without interest, instead of on thirty days' time, as before. This is understood to include everything except feed for their teams, which cannot be obtained on those terms. There are other reports to the effect that President GOWEN will retire at the annual meeting next January. These last seem to need confirmation."

Lehigh Coal and Navigation Company.—This stock is unchanged; the sales amount to 6,620 shares. We note the statement that the differences existing between this company and the New Jersey Central Railroad Company, as to the indebtedness of each to the other, have been entirely and amicably adjusted to the satisfaction of both parties thereto. As a result, it is possible that the Lehigh Navigation Company may declare its regular dividend, as it has been said that the paper of the New Jersey Central will be used to raise the money necessary to pay the dividend, it having been earned, but represented in this extended indebtedness of the New Jersey Central.

Lehigh Valley Railroad.—The quotations of this stock are well maintained, and a slight advance is noticeable in the closing quotation.

Catawissa Railroad.—This company announces a dividend of 3½ per cent. on the preferred stock, payable on the 15th instant.

Bonds exhibit a little more activity, the total transactions amounting to $108,600.

Quotations and Sales of Stocks and Bonds.

For the week ending Nov. 9, 1876.

STOCKS.

	Highest	Lowest	Closing	Shrs
Lehigh Valley RR. Co	50⅛	49⅝	50	626
Pennsylvania RR.	47	46½	46¼	55,367
Reading RR.	23⅛	21⅝	21⅞	33,968
Lehigh Coal and Nav. Co	31⅞	31	31	6,620
Penn. Canal	—	—	*9	—
Buck Mountain Coal Co	—	—	*25	—
Fulton Coal Co	—	—	*3½	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co	—	—	*1	—
Cambria Iron Co	—	—	*16	—
Crane Iron Co	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co	—	—	65	121

Total shares sold 96,702
Sales for the week previous 91,287
Increase 5,415

* These quotations are nominal.

BONDS.

		Sales.	Price.
H. and B. T. RR.	1st mortgage, 7s	$ ——	—— @107
" " "	2d " "	——	—— @102
" " "	3d " cons	——	—— @ 38
Lehigh Valley RR.	Con. mtg. 6s	10,000	—— @100½
" " "	7s, 1910	1,000	—— @112
" " "	6s Reg.	——	—— @103½
" " "	6s coup.	——	—— @108
Pennsylvania RR.,	1st mtge. 6s	5,000	106½@106¾
" "	gen. " cou. 1910	15,000	106¾@107
" "	gen. " 6s, reg.	11,000	105¾@106
" "	Cons. M. 6s reg.	3,000	101 @101½
Phil. & Reading RR.	Con. M. 7s Reg.	3,000	101½@102
" "	" G. M. 7s, coup.	——	—— @105
" "	" Gen. M. 7s reg.	——	—— @103
" "	new convertible 7s	14,900	72 @ 73
" "	7s '93	3,000	—— @104½
" "	Cons M. 7s coup	23,000	101½@102
" "	debenture 6s	——	—— @ 65
Phil. & Reading C. & I. Co.	Deb. 7s	——	—— @ 69
" "	Tamaqua tract	——	—— @ 66
Lehigh Coal & Nav. Co.,	6s '84	6,500	102½@103
" " "	RR. 6s, '97	1,200	—— @101½
" " "	con. 7s	——	—— @ 90
" " "	6s gold loan	6,000	101½@102
" " "	Conv. gold loan	5,200	—— @102
Penn. Canal, 6s		1,000	—— @ 72
Penn. and N. Y. Canal, 7s		——	—— @110½
Ches. and Del. Canal, 6s		——	—— @ 85
Susquehanna Canal, 6s		——	—— @ 68
Delaware Division Canal, 6s		——	—— @—
Susquehanna Coal Co. 6s		——	—— @ 77
Buck. Mount Coal Co. 6s		——	—— @—
Penn. Gas Coal Co. 6s		——	—— @—
Honeybrook Coal Co. 7s		——	—— @—
Total amount of sales		$108,600	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Nov. 8, 1876.

BUSINESS has been extremely dull the last week, in fact there has been nothing doing, the election excitement absorbing all the attention. Allouez 10 bid without sales. Calumet steady, fluctuating between 171 and 171½, closing 171 bid, 171⅞ asked. Copper Falls has received within the week a very good letter from the mine, but so far it has not had the slightest effect. Duncan very quiet at $11 until to-day, when it has dropped ⅛ per cent. to 10⅛ sales. International Silver very dull at 1⅛ to 1 3-16, with sales at both figures. Dawson sold at .20 the first of the week, sale to-day at 17¼. National steady at 2⅛ bid. Quincy very quiet, a private sale of 2 shares at 48 yesterday, seems to be about the extent of sales. In the small coppers nothing.

Copper Products.—The following mines have reported their product for the month of October: Franklin, about 109 tons; Pewabic, 26 tons; Osceola, 103 tons.

Gold and Silver Stocks.

AMERICAN MINING BOARD.

NEW YORK, FRIDAY EVENING, Nov. 10, 1876.

THE mining share market in common with everything else, suffers in consequence of the excitement attending the elections. The list is generally lower. The sales for five days, (there being no session of the Board on the 7th instant,) amounts to 35,700 shares, a decrease of 6,350 shares, compared with the transactions for the week previous. Even of these a considerable proportion is supposed to have been of the class known among brokers as "washed."

The reports from the Comstock mines as given below from our exchanges, indicates almost without exception, that they are seriously inconvenienced by the flooding of water, and this seems to occur almost simultaneously with the striking of an ore body. So say the stock speculators. It is to be hoped that the activity and developments which have been going on for a long time past in those mines which are favorably situated, will soon begin to bear fruit in the shape of dividends. The Justice, Overman, Exchequer, Alpha, Imperial, and Bullion are expected soon to show up fine developments of ore, and in nearly all of the mines on the Comstock preparations are being made for further development. The Consolidated Virginia Company has declared its regular monthly dividend of $2 per share.

Cedarburg N. E. Gold Mine.—2,930 shares of this stock have been sold in the market during the week at from $5 to $5.62½ per share.

St. Joseph Lead Mining Company.—The stock of this company has recently been added to the list; it consists of 100,000 shares of the par value of $10. This company has disbursed monthly dividends at the rate of one per cent. per month. The closing bid quotation was $7 per share or 70 per cent. of the par value.

Consolidated Virginia.—Daily yield for the past week 416 tons of ore. The ore is still of the same uniformly rich character as that heretofore extracted. The ore breasts on the 1,400, 1,500 and 1,550-feet levels continue to show well. A large blower is being erected on the 1,500-feet level in order to facilitate the ventilation of the mine. On the 1,300 and 1,400-feet levels all the old drifts are being repaired and some new cross-cuts made in order to assist the egress of the foul air and keep that portion of the mine in perfect order for the extraction of the ores from those sections whenever it is desirable to do so. While the workmen were extending the ore breasts on the 1,400-feet level to the northward, recently the heavy clay wall to the eastward suddenly cracked wide open, letting in a strong rush of water. This flow of water still continues, but is not so strong as at first, showing plainly that the head is gradually being drawn off. The water is also quite cold, a sure indication at that depth of a small body. The mine is in good condition throughout and should the flow of water be strong enough to reach the lower levels, the Gould & Curry shaft will receive it and prevent any delay in the working of the mine. The north drift on the 1,700-feet level is making slow progress. It is expected that much better progress will be made as soon as the pipes connecting with the surface are completed, so as to have the full use and force of the drills. The main west drift on the 1,650-feet level of the C. & C. shaft is in to-day 135 feet, the face in good blasting ground. This drift is advancing at the rate of 10 feet per day.

California.—Daily yield, 450 tons of ore. The mine never showed better, nor was the ore extracted ever of a better quality than it is at present. The ore breasts on the 1,500-feet level extending east are still of the same immensely rich character, and the appearances indicate beyond a doubt that the ore body at that point exceeds the width it has developed at any other point in either the Consolidated Virginia or California. The face of the main south drift on the 1,650-feet level is still in ore of the richest character. This drift is making steady progress and is now in 155 feet. The main drift west from the C. & C. shaft on the 1,650-feet level is in 135 feet, the face in good blasting ground. The station at the 1,600-feet level has been enlarged, during which time it is necessary to suspend sinking the shaft. The new ore dumps at the C. & C. shaft are about finished ready for the reception of ore. The new side-track of the railroad is also nearly finished. However, one of the most important announcements that we have to make is a very considerable decrease in the flow of water at the bottom of the C. and C. shaft, for the past six months the flood of water in that shaft has been so great that the miners have literally been obliged to work under water or not at all. At one time the shaft was actually sunk 150 feet without the bottom ever being seen, the whole of that distance being in hard blasting rock. The pumps are now running at the rate of six

MINING STOCKS.

AMERICAN MINING BOARD'S LIST.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	a No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations g American Currency. Sat.	Mon.	Wed.	Thurs.	Fri.	Shares sold during the Week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75. $1.	....	.....	$46 50	$41 00	$46 75	$47 00	$48 25	930
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71. $1.	$15,397,200	April 10, '76, $1.	18 50	17 75	18 62½	17 25	*19 00	520
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	136,192	July 13, '74. 50c.	....	.....	51 00	48 50	49 00	51 00	47 00	270
Bullion, G S.	Nevada	943¾	10,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	36 50	35 00	....	....	....	150
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.00.	....	.....	....	10 25	11 00	10 75	9 12½	410
California, G. S.	Nevada,	600	54,000,000	540,000	....	.....	6,480,600	Oct. 16, '76, $2.	59 50	56 00	56 50	60 00	*63 50	70
Centennial, G.	Califor.	66 acres	1,000,000	100,000 b	**	.....	....	.....	....	....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	84 00	80 00	*33 00	*84 00	....	350
Cleveland, G.	Colo.	3,715	250,000	25,000 b	....	.....	....	.....	8 87½	9 00	9 12½	8 75	9 00	4,800
Cons. Hercules & Roe, S	Colo.	10,500	1,000,000	100,000	**	.....	120,000	.....	5 87½	6 00	5 87½	5 75	6 00	2,900
Cons. Imperial, G.S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	3 75	3 50	5 00	4 00	4 00	900
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540 000	411,200	June 11, '73. $3.	23,760,000	Oct. 11, '76, $2.	54 50	*57 00	*50 75	55 00	54 50	....
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.53½	*18 00	13 50	....	16 00	11 00	50
Crown Point, G. S.	Nevada,	600	10,000,000	100,000	1,173,370	Oct. 26, '76, $1.	11,588,000	Jan. 12, '75, $2.	10 50	9 50	11 62½	*12 75	12 00	350
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	14 12½	....	....	....	....	....
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	16 75	12 00	14 00	16 00	16 00	250
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Aug. 11, '76, $1.	3,826,800	Oct. 10, '70, $10.	15 75	12 25	15 00	16 00	14 00	1370
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	4 37½	4 87½	5 37½	5 50	5 62½	6320
Hale & Norcross, G. S.	Nevada,	400	11 200,000	112,000	2,247,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	9 12½	9 00	8 50	8 50	7 00	950
Hukill, S.	Colo.	3,288	1,000,000	10,000	**	.....	10,000	$1	....	....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	*6 00	....	....	....	....	.....
Julia Cons, G. S.	Nevada,	3,000	11,000,000	110,000	110,000	Sept. 11, '76, $1.	....	.....	7 50	6 50	7 50	6 00	....	350
Justice, G. S	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	25 50	21 00	26 00	25 50	27 12½	1300
Kentuck, G.S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74. $1.	1,252,000	March 8, '70, $5.	15 25	13 25	....	....	....	400
Kossuth, G.S.	Nevada,	2,700	5,400,000	108,000 c	405,000	Aug. 15, '76, 50c.	....	.....	2 12½	....	....	....	....	300
Leopard, G. S.	Nevada,	1,500	5,000,000	50,000	50,000	March 31, '76, $1.	112,500	Oct. 16, '76, 50c.	8 00	6 75	....	....	....	200
Luzerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	1 50	1 37½	1 62½	1 37½	1 87½	4750
Mer. and Min. Tun. Co.	Colo.	30,000	500,000	50,000	**	.....	....	.....	4 75	*5 00	4 87½	4 87½	4 75	2350
Mexican, G. S.	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	31 00	....	*31 00	*29 50	*30 00	500
Merrimac, S	Mass.	1,500	500,000	5,000	**	.....	10,000	Nov. 10, '76, $1.	....	40 25	41 00	*41 00	40 62½	300
Morning Star	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	850,000	Oct. 16, '76, $1.	*28 50	....	27 00	25 00	....	.....
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '04, $4.	55 50	52 00	51 00	*54 50	53 00	300
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	2 87½	2 87½	....	2 50	2 50	190
Overman, G. S.	Nevada,	1,200	3,840,000	38,400 b	2,222,280	Oct. 21, '76, $3.	....	.....	*92 00	....	*89 00	*91 00	....	.....
Pleasant View	Colo.	1,200	200,000	20,000	**	.....	....	.....	1 62½	*1 62½	*1 75	*1 75	1 37½	100
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	510,000	Nov. 5, '75, $3.	3,075,000	Sept. 10, '73, $3.	5 25	6 00	6 75	*8 00	....	200
S S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	.....
Savage, G.S.	Nevada,	800	11,200,000	112,000	2,746,000	May 31, '76. $2.	4,460,000	June 11, '69, $3.	14 25	12 75	14 37½	13 37½	13 62½	730
Sec. Belcher, G.S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	....	....	....	....	....	.....
Sierra Nevada, G. S.	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	....	....	*15 00	13 00	.. .	50
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	....	.....	....	.....	1 00	*2 00	87½	*2 05	1 87½	600
Silver Hill, G. S.	Nevada,	5,400	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	*13 00	....	*11 50	*11 50	10 50	100
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	.....
South. California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	2 75	3 00	....	2 62½	2 75	1850
Trenton, G. S.	Nevada,	..	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	.....
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	14 50	13 87½	11 50	.. .	15 00	600
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	21 00	17 50	22 75	20 87½	20 00	650
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	... ..

No sales.—Election Day.

Assessments levied to date, $27,647,782. Div'ds pd. to date, $80,438,400. Total sales..... 35,700

BOSTON STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.		
Allouez, C.	Mich.	..	$1,000,000	20 000	$940,000	May 9, '76. $5.	....	.....	$10 00	10 00	10 00		10 00	10 00		.....
Calumet and Hecla, C.	Mich.	¾ mile	2,000,000	80,000 d	1,200,000	.....	$11,050,000	Oct. 21, '76, $5.	171 00	170 50	171 00		171 50	171 00		.... .
Central, C.	Mich.	..	500,000	20,000 c	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	35 00	35 00	35 00		35 00	35 00		.....
Copper Falls, C.	Mich.	..	1,000,000	20,000 d	535,000	May 10, '76,	100,000	Nov., '71, $1.	4 25	4 12½	4 12½		4 00	4 00		.....
Dana, C	Mich.	..	500,000	20,000 d	68,000	Jan., '73, 50c.	....	.....	13	13	12		12	12		.....
Dawson, S.	Canada.	..	1,200,000	60,000 f	....	.....	....	.....	17½	18	18		17½	17		.....
Duncan, S.	Canada.	..	1,200,000	60,000 f	75,000	July, '76, 41½.	....	.....	11 00	10 87½	11 00		11 00	10 50		.....
Franklin, C	Mich.	..	500,000	20,000 d	360,000	June, '68, $5.	585,000	Nov., '71, $1.	13 25	13 25	13 25		13 12½	13 00		.....
†Humboldt, C.	Mich.	..	500,000	20,000 d	100,000	Sept. 28, '76, 15c.	....	.....	2	2	2		2	2		.....
International, S.	Canada.	..	1,200,000	60,000 f	....	.....	....	.....	1 18¾	1 18¾	1 12½		1 12½	1 12½		.....
Madison, C.	Mich.	..	50 1,000	20,000 d	123,000	Sept. 11, '74, 10c.	....	.....	30	28	27		27	25		.....
Mesnard, C.	Mich.	..	500,000	20,000 d	160,000	April 12, '65, 50c.	....	.....	30	30	28		28	28		.....
Minnesota, C.	Mich.	..	1,000,000	20,000 c	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 25	1 12½	1 12½		1 00	1 00		.....
National, C	Mich.	..	500,000	20,000 c	195,000	Oct., '75, $1.	360,000	Oct., '73. $1.	2 12½	2 12½	2 12½		2 12½	2 12½		.....
Osceola, C	Mich.	..	1,000,000	40,000 d	880,000	May 1, '76, $2.	....	.....	19 00	19 00	19 00		19 00	19 00		.....
Petherick, C.	Mich.	..	500,000	20,000 d	165,533	March 22, '76, 50c.	....	.....	55	55	55		55	55		.....
Pewabic, C	Mich.	..	500,000	20,000 d	185,000	June, '68, $3.	460,000	July, '73. $1.	4 00	4 00	4 00		4 00	4 00		.....
Phenix, C.	Mich.	..	1,000,000	20,000 d	817,500	Sept., '70, $3.	....	.....	....	....	....		....	....		.....
Quincy, C.	Mich.	..	h 200,000	20,000 b	....	.....	2,050,000	Oct. 28, '76, $3.	48 50	48 50	48 50		48 00	48 00		.....
Ridge, C.	Mich.	..	500,000	20,000 d	....	.....	....	.....	5 75	5 75	5 75		5 75	5 75		.....
Rockland, C.	Mich.	..	500,000	20,000 d	495,000	Jan., '74, $1.	....	.....	30	30	30		30	30		.....
Star, C.	Mich.	..	500,000	20,000 d	265,000	March 30, '76, 50c.	....	.....	37	35	35		35	35		.....
Superior, C.	Mich.	..	500,000	20,000 d	340,000	March, '74, 25c.	....	.....	12⅛	12½	12½		12¼	12⅛		.....

No sales.—Election day.

Assessments levied to date, $7,440,033. Div'ds paid to date, $17,445,000. Total sales ....3,500 shares.

a. Gold. s. Silver. L. Lead. c. Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. *f* Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. ** Not Assessable. †Ass. unp aid.

and-a-half strokes a minute, and keep down the water with ease at that. Since the water was struck until now the rate has never been less than ten strokes per minute.

Justice.—Daily yield 210 to 220 tons of ore. This amount of ore is in excess of that required to keep the mills running, and is being taken out in order to create a reserve to guard against the stoppage of hauling at any time by the Winter storms. The ore stopes on the 400, 500, 600, 700 and 800-feet levels are all showing well and yielding good ore. Especially is this the case with the ore body going north on the 400-feet level, and the ore development in the winze below the 800-teet level, the ore in that winze being of as fine a decription as any yet developed in the mine. The upraise being made to connect the 800 and 700-feet levels is also in rich ore. The south drift on the 800-feet level is also yielding good milling ore. The southeast drift on the 1,000 feet level is steadily advancing, the face in very favorable rock. The northeast cross-cut on the 1,000-feet level is being rapidly pushed ahead, the face in soft porphyry mixed with quartz and spots of low grade ore.

Crown Point.—Sinking the main incline is making good headway below the 1,800-feet level. The water from the 1,700-feet level has been turned into the Belcher air-shaft, and preparations are being made to tear all the old pumping machinery out of the main incline. Some additional crosscutting is soon to be commenced on the 1 700-feet level. Daily yield, 60 tons of ore—keeping the Rhode Island mill steadily running.

Belcher.—The prospecting drifts on the 1 500 and 1,600 feet levels show no important changes during the week. The south drift on the 1,600-feet level is in a distance of 506 feet. Sinking the main incline shaft has been resumed. Sinking the combination pump shaft below the 1,700-feet level has also been commenced. The ore stopes show no change. Daily yield 300 tons of ore.

Bullion.—There is little if any change in either of the drifts or crosscuts on the 1,400, 1,500, 1 600 or 1,700-feet levels. All are being advanced at the usual rate of progress. The prospects of the mine are excellent. The north drift on the 2,000-feet level, in Alpha ground, which was stopped on account of the repairs to the imperial incline, was again started on the 30 ult. The face of this drift is showing some quartz and ore.

Imperial Consolidated.—The iron track in the main incline was completed on the 30 ult. and work resumed in all the drifts and crosscuts on the 2,100-feet level. The south drift from the bottom of the south winze on the same level running to connect with the Yellow Jacket north drift shows no change. The face of the north drift from the bottom of the south winze is almost entirely in quartz, with strong indications of soon finding ore.

Hale & Norcross.—The pumps are throwing water day and night to their fullest capacity. They are working, both the large and small, with the utmost perfection. The water drained forms a small river, and the main incline is now clear of water nearly down to the 1,900-feet level, or about 50 feet below where the big burst flooded the pumps some time since.

Overman.—Sinking the shaft is going forward at the rate of two and a half feet per day, the bottom still in very favorable ledge matter. The north drift on the 1,200-feet level is steadily advancing at the rate of seven feet per day, the face still in quartz and ledge matter. The south drift on the same level is being pushed ahead at the rate of seven and a half feet every twenty-four hours, and is also in very encouraging ledge matter. The erection of the huge pumping engine and other pumping machinery is advancing at a very rapid rate.

Silver Hill.—The main line of pumps have been completed and are in splendid running order down to the 650-feet level. The water has been entirely extracted from the main incline and the sinking resumed in good earnest. The north drift on the 444-feet level is steadily advancing at the rate of 5 feet per day. This drift is now in a distance of 720-feet. The east drift on the 600-feet level is still suspended, pending the putting in of an ore shute extending from the drift downward, in the character of an incline, to the main shaft.

Julia.—The east drift, on the 1,800-feet level, was again started up on the 30 ult., the strong flow of water at that point having almost entirely ceased. The main south drift, on the 1,800-feet level, is showing much more favorable than it has for some time past. The quartz shows a much stronger and better concentration in the face and is of a more lively character than has heretofore been encountered. The main south drift, on the 1 600-feet level, is in quartz and lively ledge matter and is making excellent progress.

Chollar Potosi.—Daily yield, 160 tons of ore, the assay value of which is $31 per ton. This ore is extracted from the old upper workings of the mine, where the company have yet thousands of tons of low grade ore to extract and reduce, whenever labor and milling facilities become cheap enough to warrant it. Sinking the main incline below the 1,600-feet level is being pushed ahead with the usual vigor. This is all the work that is now done in the mine. The erection of the pumping machinery at the combination shaft is going ahead as

usual. Sinking the combination shaft is also making excellent progress.

Mexican.—The west drift on the 1,465-feet level, following the line of the diamond drill hole recently run, was again started up on Monday last. The face of this drift is in fine ledge material, and must in a short time reach the spot where the drills penetrated the ore which gave such large assays. The upraise on the same level is still showing well. The west cross-cut recently started on the 1,300-feet level is showing some very favorable quartz.

Alta.—The new pump to supply the place of the one recently bursted has arrived, and will be placed in position ready for use at the earliest possible moment. As soon as the pump is in good running order sinking the shaft will be resumed.

Savage.—The pumps are kept running up to their full working capacities. The water has been reduced several feet below the point where it took the sudden rise some two weeks since. The pumps are steadly gaining on the flow, and if another sudden burst does not take place, the mine must soon be drained.

Yellow Jacket.—At the 1,940-feet level the south winze is down 100 feet, with the bottom in good sinking ground. At the 2,040-feet level a cross-cut east has been started 100 feet south of cross-cut No. 1. It is now in 55 feet, with the face in porphyry and quartz, carrying some metal.

Caledonia.—The north drift on the 150-feet level is still advancing at a very favorable rate of speed, the face in soft ledge material. Sinking the main shaft is progressing at the rate of 2½ feet per day. The flow of water is still strong.

Sutro Tunnel.—Face of header in very good working material, principally porphyry, with streaks of quartz and clay. It blasts well and allows of very fair progress. Total length of tunnel on the 31st ult., 14,887 feet.—*Gold Hill News*, Nov. 1st.

Gas Stocks.

NEW YORK, FRIDAY EVENING, Nov. 10, 1876.

THE market for gas stocks is very quiet; we alter a few of the quotations to lower figures.

The London Gas Light and Coke Company will reduce the prices of gas on the 1st of January next to 3/ 6d. for common gas, and 4/ 4d. per 1,000 feet for cannel gas. These prices are equivalent to about 93c., and $1.16 American currency, respectively.

Gas in Japan.—The streets of Tokio and Osaka are now lined with gas lamps.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Divid.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '76	108	109
" " Bonds	90,000	1,000	†3½	Feb. '76	106	110
NewYork, "	4,000,000		5	Nov. '76	135	138
Metropol. "	2,500,000	100	5	Sep. '76	140	145
" " Certf.	1,000,000	....	3½	" "	102½	104½
" " Bonds	500,000	1,000	3½	Jan. "	102	102½
Harlem "	1,850,000	50	4	Aug. '76	103	106
Manhattan"	4,000,000	50	10	July "	240	242
Brooklyn, B'klyn	2,000,000	25	5	Nov. '76	179	181
Nassau "	1,000,000	25	4	Jan. '76	75	—
" " Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	50	55
" " Certf.	300,000	1,000	3½	July '76	88	90
" " Bds	325,000	....	3½	Aug. "		95
Metropol. "	1,000,000	10	3½	May, '76	76	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" " Certf.	1,000,000	....	3½	July "	101	102½
Citizen's "	1,200,000	20	2½	Jan. '76	96	98
" " Certf.	320,000	1,000	3½	Oct. "	98	100
J. C. N.J.....	386,000	20	5	July,'75	100	—
Centl. Westch. N.Y.	466,000	50	4	July, "	90	—
Subur'n " "	390,000	50				90

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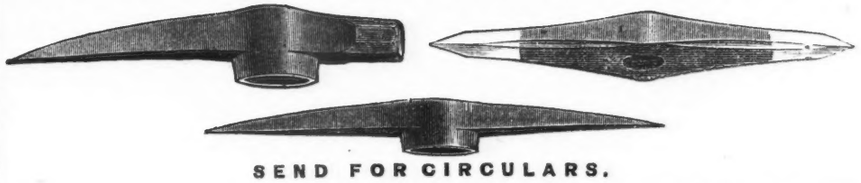

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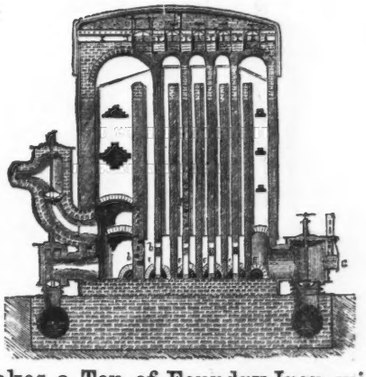

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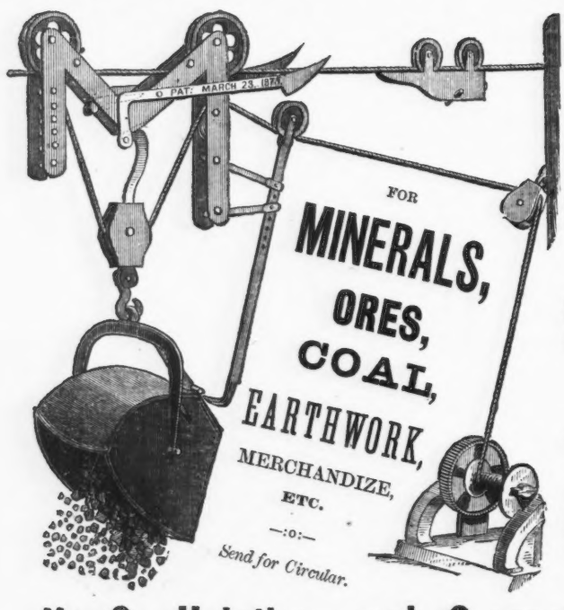

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